

## **APPENDIX A**

### **Background Data**

## 1.0 Background Information Reviewed

The following **Table 1-1** summarizes the background information reviewed for the preparation of the hydrologic modeling.

**Table 1-1 – Background Data**

| Data                                                                                                                                                   | Source          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| City of Markham SWMSOft Database                                                                                                                       | City of Markham |
| Toronto and Region Conservation Authority (1999). <i>Town of Markham Stormwater Retrofit Study</i> .                                                   | City of Markham |
| Toronto and Region Conservation Authority (2012). <i>Stormwater Management Criteria DRAFT Version 1.0</i> .                                            | TRCA            |
| Marshall Macklin Monaghan (2004). <i>Don River Hydrology Update</i> .                                                                                  | TRCA            |
| Don River hydrology models                                                                                                                             | TRCA            |
| Don River floodplain mapping                                                                                                                           | TRCA            |
| Don River hydraulic models                                                                                                                             | TRCA            |
| Aquafor Beech Limited (2004). <i>Highland Creek Hydrology Update Final Report</i> .                                                                    | TRCA            |
| Highland Creek floodplain mapping                                                                                                                      | TRCA            |
| Highland Creek hydraulic models                                                                                                                        | TRCA            |
| Highland Creek hydrologic model                                                                                                                        | TRCA            |
| Rouge River floodplain mapping                                                                                                                         | TRCA            |
| Rouge River hydraulic models                                                                                                                           | TRCA            |
| Marshall Macklin Monaghan (1988). <i>A Technical Report Hydrologic Modelling for the Rouge River Watershed Flood Plain Mapping Extension Program</i> . | TRCA            |
| Rouge River hydrologic model                                                                                                                           | TRCA            |
| Marshall Macklin Monaghan (2001). <i>Rouge River Watershed Hydrology Update Final Report</i> .                                                         | TRCA            |
| EBNFLO Environmental (2006). <i>Rouge River Watershed HSP-F Update and Future Scenarios Modelling</i> .                                                | TRCA            |
| Aquafor Beech Limited (2010). <i>Burdenet Creek Erosion Control Optimization Study Phase 1 Final Report</i> .                                          | City of Markham |
| David Schaeffer Engineering Ltd. (1996). <i>Design Brief for the Stormwater Management Wetland, Daniels Rouge Subdivision</i>                          | City of Markham |
| David Schaeffer Engineering Ltd. (1996.) <i>Storm Sewer Hydraulic Analysis for the Daniels Rouge Subdivision</i>                                       | City of Markham |
| (1996). <i>Operation and Maintenance Manual for the Stormwater Management Wetland, Daniels Rouge Subdivision</i> .                                     | City of Markham |
| Andrew Brodie Associates Inc. (1998). <i>Stormwater Management Analysis for The Markham Municipal Centre</i>                                           | City of Markham |

| Data                                                                                                                                                                                                | Source          |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Cosburn Patterson Wardman Limited, Michael Michalski Associates, and MacViro Consultants (1994). <i>Final Report on Environmental Management Plan for Urban Expansion Area – Volume 5.</i>          | City of Markham |
| Cosburn Patterson Mather Ltd. (2001). <i>Exhibition Creek Relocation Design Brief, Greensborough (OPA51).</i>                                                                                       | City of Markham |
| Massongsong Associates Engineering Ltd. (2001). <i>Stormwater Management Brief, Village of Fairtree Subdivision – Ph 1 and 2.</i>                                                                   | City of Markham |
| Masongsong Associates Engineering Ltd. (2002). <i>Addendum of the Phase 1 and 2 Stormwater Management Brief, Village of Fairtree Subdivision Ph 4 and 4.</i>                                        | City of Markham |
| Andrew Brodie Associates Inc. (1983). <i>Design of Stormwater Detention Ponds, Channels and Trunk Storm Sewers, Armadale Community (Area 1A).</i>                                                   | City of Markham |
| Cosburn Patterson Mather Ltd. (1996). <i>Environmental Master Drainage Plan, OPA 22 (South Unionville Secondary Plan)</i>                                                                           | City of Markham |
| Masongsong Associates Engineering Ltd. (2008). <i>Functional Servicing Report</i>                                                                                                                   | City of Markham |
| The Proctor & Redfern Group (1979). <i>Morningside Tributary Stormwater Management Planning Study.</i>                                                                                              | TRCA            |
| Wisner, Paul (1981) <i>Morningside Tributary in Markham Floodline Determination Hydrologic Changes Caused by Urbanization and SWM Alternatives.</i>                                                 | TRCA            |
| Environmental Hydraulics Group / Masongsong-Atkari Engineering Limited (1994). <i>Storm Water Management Report Cedarland Properties Limited Armadale East 3/4 Denison Street and Markham Road.</i> | TRCA            |
| Andrew Brodie Associates Inc. (1983). <i>Data for the Verification of Detailed Drainage and Park Storage Design in Planning Area 1A.</i>                                                            | TRCA            |
| CFN 3459 – Study Area 1A Letters and Correspondence                                                                                                                                                 | TRCA            |
| Andrew Brodie Associates Inc. (1980). <i>Master Drainage Plan PD1-3 Area in Unionville.</i>                                                                                                         | TRCA            |
| CFN 2551 - Other Records                                                                                                                                                                            | TRCA            |
| Andrew Brodie Associates Inc. (1986). <i>Master Drainage Plan Riseborough Centre Area.</i>                                                                                                          | TRCA            |
| Marshall Macklin Monaghan Limited (1981). <i>Stormwater Management Master Plan.</i>                                                                                                                 | TRCA            |
| Marshall Macklin Monaghan Limited (1982). <i>Stormwater Management Master Plan Study Area 1C Preliminary Design Summary.</i>                                                                        | TRCA            |
| Cosburn Patterson Wardman Limited (1986). <i>Study Area 1C Drawing Set.</i>                                                                                                                         | TRCA            |
| CFN 3556.A – Study Area 1C (Markham) – 1985 Correspondence                                                                                                                                          | TRCA            |
| Marshall Macklin Monaghan Limited (1981). <i>Thornlea East Community Design Brief.</i>                                                                                                              | TRCA            |
| Marshall Macklin Monaghan (1980). <i>A Report to The Town of Markham on The Feasibility of Storm Water Management on the West Risebrough – Phase II Industrial Area.</i>                            | TRCA            |

| Data                                                                                                                                                                                           | Source |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| <i>CFN 3934 – Cedarland Properties Ltd Drawings &amp; Other Records</i>                                                                                                                        | TRCA   |
| <i>Cosburn Patterson Wardman Limited (1990). Buttonville North Master Drainage Plan.</i>                                                                                                       | TRCA   |
| <i>Schaeffers Consulting Engineers (1998). Addendum to the Revised Buttonville North Master Drainage Plan Town of Markham.</i>                                                                 | TRCA   |
| <i>Cosburn Patterson Wardman Limited (1991). Buttonville North Master Drainage Plan Design Revision to Ponds 2D and 2F.</i>                                                                    | TRCA   |
| <i>CFN 18505.B – Buttonville Business Park, Town of Markham Correspondence &amp; Drawings.</i>                                                                                                 | TRCA   |
| <i>Sabourin Kimble &amp; Associates Ltd. (1990). Subject: Master Drainage Plan Beaver Creek in Support of the Development of Buttonville Airport.</i>                                          | TRCA   |
| <i>Sabourin Kimble &amp; Associates Ltd. (1990). Master Drainage Plan Beaver Creek in Support of the Proposed Development of the Buttonville Airport Lands Town of Markham.</i>                | TRCA   |
| <i>Cosburn Patterson Mather (1997). Re: Galleria Markham Development East Pond Retrofit Town of Markham.</i>                                                                                   | TRCA   |
| <i>Gartner Lee Limited (1997). Re: Markham Creek Pond Retrofit – Mitigation Measures.</i>                                                                                                      | TRCA   |
| <i>Cosburn Patterson Mather Limited (1997). Galleria Markham Pond Details (Retrofit) Drawing Nos. 701, 702, 703.</i>                                                                           | TRCA   |
| <i>Insite (1997). “The Galleria” Markham East Pond Park Masterplan Sheet L4.</i>                                                                                                               | TRCA   |
| <i>CFN 28563 – 1107656 Ontario Inc. Correspondence</i>                                                                                                                                         | TRCA   |
| <i>CFN 105061 – Thornlea East Community Correspondence</i>                                                                                                                                     | TRCA   |
| <i>Marshall Macklin Monaghan (1981). Storm Drainage Study Thornlea East Community Town of Markham.</i>                                                                                         | TRCA   |
| <i>CFN 105062 – Thornlea East Community Drawings</i>                                                                                                                                           | TRCA   |
| <i>Fred Schaefer &amp; Associates Ltd. (1995). Stage I Stormwater Management Plan for the Proposed Draft Plan of Subdivision of Part of Part 1, Plan 64R-7287 (19T-95063) Town of Markham.</i> | TRCA   |
| <i>Schaeffers Consulting Engineers (1997). Functional Servicing Report for the Draft Plan of Subdivision, Part of Part 1 64R-7287 Town of Markham Regional Municipality of York.</i>           | TRCA   |
| <i>Schaeffers Consulting Engineers (1998). Stormwater Management Design Plan Major and Minor Systems Analysis Rouge Fairways Subdivision Town of Markham.</i>                                  | TRCA   |



| Data                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Source          |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <p><i>Pond Area A1 Miscellaneous Information</i></p> <ul style="list-style-type: none"> <li>Area A1 map showing pond locations.</li> <li>Fred Schaeffer &amp; Associates Limited (1987). <i>Re: Fred Sharf Storm Water Management Detention Facility.</i></li> <li>Stormwater Pond Inventory Pond Reference Nos. 235.0, 235.1, 235.2, 235.3, 235.4, and 31.8. <ul style="list-style-type: none"> <li>Cosburn Patterson Wardman Limited (1988). <i>Re: Stormwater Management Plan Armadale Centre Phase IV Town of Markham.</i> <ul style="list-style-type: none"> <li>Figures and drawings.</li> </ul> </li> </ul> </li> </ul>                       | TRCA            |
| Wisner, Paul (1979). <i>Storm Water Management Study for A New Development In North East Markham.</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | TRCA            |
| Dipen Mukherjee & Associates Ltd. (1988). <i>Stormwater Management Report Rouge River Fairways (Subdivision No. 19T – 87112) Town of Markham.</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | TRCA            |
| Marshall Macklin Monaghan Limited (1990). <i>Rouge North Fairways Subdivision Water Quality Pond Details Town of Markham.</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | TRCA            |
| Dipen Mukherjee & Associates Ltd. (1988). <i>Rouge North Fairways Final Grading Plan (Minor System Pond) Drawing No. 53.</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | TRCA            |
| Cosburn Patterson Wardman Limited (1992). <i>Re: Stormwater Management Report Draft Plan of Subdivision 19T-87119 14<sup>th</sup> Avenue and McCowan Road Town of Markham.</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | TRCA            |
| <p><i>Demarco-Webjo Development Pond 110 Miscellaneous Information</i></p> <ul style="list-style-type: none"> <li>Stormwater Pond Inventory Pond Reference No. 110.0.</li> <li>(1994). <i>Design Brief for the Extended Detention Pond Demarco/Webjo Residential Development Town of Markham.</i></li> <li>Fred Schaeffer &amp; Associates Ltd. (1994). <i>Technical Brief Function Drainage Analysis (Revised) Invar (York) Limited Subdivision (19T-84074) Webjo Subdivision (19T-84073) Markham Road (Hwy 48) and 14<sup>th</sup> Avenue Town of Markham.</i> <ul style="list-style-type: none"> <li>Drawings and figures.</li> </ul> </li> </ul> | TRCA            |
| <i>Twiga Consultants Ltd. (1978). Delmark Estates Storm Drainage Plan Drawing Nos. 3 and 4.</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | City of Markham |
| <i>Twiga Consultants Ltd. (1978). Delmark Estates Overland Flow Drawing No. 31.</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | City of Markham |
| <i>Twiga Consultants Ltd. (1978). Delmark Estates Grade Control Plan Drawing Nos. 7, 8, 9, and 10.</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | City of Markham |
| Miller Paving Limited (2010). <i>Existing Conditions South Beaver Creek Watershed.</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | City of Markham |

| Data                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Source          |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <ul style="list-style-type: none"> <li>GIS data <ul style="list-style-type: none"> <li>▪ Building</li> <li>▪ CGISOWN_CREEK</li> <li>▪ CGISOWN_DITCH</li> <li>▪ CGISOWN_POND</li> <li>▪ CGISOWN_RIVER <ul style="list-style-type: none"> <li>▪ CITYBND</li> </ul> </li> <li>▪ Contours</li> <li>▪ Easement</li> <li>▪ OP_SCHEDULE_A <ul style="list-style-type: none"> <li>▪ Parcel</li> <li>▪ Parks</li> <li>▪ RPBFB</li> <li>▪ SLRN</li> </ul> </li> <li>▪ SWMPONDS</li> <li>▪ WOODEDAREA</li> <li>▪ WWKSOWN_CATCH_BASIN</li> <li>▪ WWKSOWN_SAN_MANHOLE <ul style="list-style-type: none"> <li>▪ WWKSOWN_SAN_SEWER</li> </ul> </li> <li>▪ WWKSOWN_STORM_MANHOLE</li> <li>▪ WWKSOWN_STORM_SEWER</li> </ul> </li> </ul> | City of Markham |
| <ul style="list-style-type: none"> <li>Aerial Image <ul style="list-style-type: none"> <li>▪ Markham_2011_15cm</li> </ul> </li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | City of Markham |
| <ul style="list-style-type: none"> <li>GIS Data <ul style="list-style-type: none"> <li>▪ ELC</li> <li>▪ ESA</li> <li>▪ Fauna</li> <li>▪ Flora</li> <li>▪ Natural Cover</li> <li>▪ Regulation Limit</li> <li>▪ Target Breakdown <ul style="list-style-type: none"> <li>▪ TRCA Property</li> <li>▪ Watercourse</li> </ul> </li> </ul> </li> </ul>                                                                                                                                                                                                                                                                                                                                                                        | TRCA            |
| TRCA Fisheries Data                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | TRCA            |

**Melody Brown**

---

**From:** Geoff Masotti  
**Sent:** Tuesday, September 11, 2012 3:05 PM  
**To:** Alan Manlucu; Patricia Osika  
**Cc:** Melody Giles  
**Subject:** FW: SWM Retrofit Study - DLA  
**Attachments:** SWM Retrofit Study - DLA.pdf

FYI,

See below regarding previously retrofitted ponds.

Regards,

**Geoff Masotti, P.Eng.**  
**Project Manager, Water Resources**

***Cole Engineering Group Ltd.***  
***70 Valleywood Drive, Markham, ON Canada L3R 4T5***  
*T: 905-940-6161 Ext. 254 Tor. Line: 416-987-6161*  
*C: 416-230-9222 F: 905-940-2064*  
*E: [gmasotti@ColeEngineering.ca](mailto:gmasotti@ColeEngineering.ca)*  
*[www.ColeEngineering.ca](http://www.ColeEngineering.ca)*

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---

**From:** Tam, Cynthia [mailto:CTam@markham.ca]  
**Sent:** Tuesday, September 11, 2012 3:03 PM  
**To:** Geoff Masotti  
**Subject:** FW: SWM Retrofit Study - DLA

Hello Geoff:

Please find attached the Data License Agreement for your review and signature. Please email me a copy after signing the agreement.

Our IT department is finishing up the orthophoto DVD, and the disc should be ready by tomorrow; I will let you know where to pick it up once it becomes available.

The following are the ponds that have already been retrofitted:

- SE Quadrant Brown's Corner (SWMSoft Pond #7)
- Leitchcroft Farm Pond 2 (SWMSoft Pond #25)
- Beaver Creek Pond 3 (SWMSoft Pond #27)
- Bridle Trail Phase 5 (SWMSoft Pond # 40)
- Unionville B-3 Subdivision (SWMSoft Pond #44)

The retrofit study reports for Ponds #25, 40, and 44 are available in SWMSoft, and unfortunately those are only

information I could find regarding the retrofitted ponds. I have been trying to locate the as-constructed drawings but no luck yet. I will follow up with Capital Works and hopefully can get something from their side.

Lastly, please do not forget to send me the Gantt Chart in excel spreadsheet format at your earliest convenience.

Thank you!

Regards,  
Cynthia Tam, M.Eng., P.Eng., PMP  
**Environmental Engineer**  
**Asset Management Department**  
**City of Markham . 8100 Warden Ave . Markham . Ontario . L6G 1B4**  
**e: ctam@markham.ca . t: 905.477.7000 x 2357 . f: 905.479.7766**

---

**From:** Dearborn, Stephen  
**Sent:** September 11, 2012 2:02 PM  
**To:** Tam, Cynthia  
**Subject:** FW: SWM Retrofit Study - DLA

Cynthia,

The GIS data is ready to burn to CD. I'm waiting for ITS to finish up the Orthophoto DVD.

The Data License Agreement is attached if you want to send it on to Cole.

Steve

---

**From:** Burke, Ewan  
**Sent:** September 10, 2012 4:31 PM  
**To:** Dearborn, Stephen  
**Subject:** RE: SWM Retrofit Study - DLA

Here you go. I'll let you know when the ortho DVD is ready.

Ewan

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**Melody Brown**

---

**From:** Geoff Masotti  
**Sent:** Tuesday, November 13, 2012 4:18 PM  
**To:** Patricia Osika  
**Subject:** Fw: Markham Ponds EA - Confirmation of Retrofit Ponds

FYI,

I guess we assume the other two are not retrofitted.

Geoff Masotti, P.Eng.  
Project Manager, Water Resources  
Cole Engineering Group Ltd.  
line: 905-940-6161 ext. 254  
cell: 416-230-9222  
gmasotti@ColeEngineering.ca

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Sent using BlackBerry

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**From:** Tam, Cynthia [mailto:CTam@markham.ca]  
**Sent:** Tuesday, November 13, 2012 04:17 PM  
**To:** Geoff Masotti  
**Subject:** RE: Markham Ponds EA - Confirmation of Retrofit Ponds

Hi Geoff:

I have no luck in finding the as-built drawings for confirmation of the ponds to see if they have been previously retrofitted. However, as per discussion with senior staff, whenever we have a retrofit report, the proposed retrofit work should have been completed. Based on this assumption, Pond # 1, 2, 3, 30, and 43 are retrofitted. For #38, and #39, the City does not have plan for the retrofit work yet.

How's the report selection at TRCA?

Regards,

Cynthia Tam, M.Eng., P.Eng., PMP  
**Environmental Engineer**  
**Asset Management Department**  
**City of Markham . 8100 Warden Ave . Markham . Ontario . L6G 1B4**  
**e: ctam@markham.ca . t: 905.477.7000 x 2357 . f: 905.479.7766**

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**From:** Geoff Masotti [mailto:GMasotti@coleengineering.ca]  
**Sent:** November 12, 2012 3:48 PM  
**To:** Tam, Cynthia  
**Subject:** Markham Ponds EA - Confirmation of Retrofit Ponds

Hi Cynthia,

Just to follow-up, we were looking for some confirmation on the ponds on the attached list which look to have been previously retrofitted. Were you able to confirm that these were retrofitted and are operating to City standard?

**Geoff Masotti, P.Eng.**  
**Water Resources, Associate**

***Cole Engineering Group Ltd.***  
***70 Valleywood Drive, Markham, ON Canada L3R 4T5***  
***T: 905-940-6161 Ext. 254 Tor. Line: 416-987-6161***  
***C: 416-230-9222 F: 905-940-2064***  
***E: [gmasotti@ColeEngineering.ca](mailto:gmasotti@ColeEngineering.ca)***  
***[www.ColeEngineering.ca](http://www.ColeEngineering.ca)***

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---

**Melody Brown**

---

**From:** Tam, Cynthia [CTam@markham.ca]  
**Sent:** Thursday, October 11, 2012 3:43 PM  
**To:** Patricia Osika  
**Cc:** Geoff Masotti  
**Subject:** RE: SWM Facility Retrofit Study - Data Request

Hi Patricia:

I have looked into STEP 1 required information and providing the following clarification:

Pond 17 – It's privately owned. As such, even if the facility is built or not, it's not within the scope of this study.

Pond 42 – It's assumed

Pond at SW corner of Caston Ave and Ian Baron Ave – It's privately owned and is gone now. No SWM Pond.

Regards,

Cynthia Tam, M.Eng., P.Eng., PMP  
**Environmental Engineer**  
**Asset Management Department**  
**City of Markham . 8100 Warden Ave . Markham . Ontario . L6G 1B4**  
**e: ctam@markham.ca . t: 905.477.7000 x 2357 . f: 905.479.7766**

---

**From:** Patricia Osika [mailto:POsika@coleengineering.ca]  
**Sent:** October 11, 2012 11:45 AM  
**To:** Tam, Cynthia  
**Cc:** Geoff Masotti  
**Subject:** SWM Facility Retrofit Study - Data Request

Hi Cynthia,

As per our meeting this morning please find attached our updated data requests. The Step 3 spreadsheet is the one that should be forwarded to the TRCA to see if they have any of the reports requested.

Regards,

Patricia Osika, B. Eng., E.I.T.  
 Water Resources Designer

**Cole Engineering Group Ltd.**  
 70 Valleywood Drive Markham, ON L3R 4T5  
 Tor. Line: 416-987-6161, Ext. 273 Phone: 905-940-6161  
 Fax: 905-940-2064  
 Email: [POsika@ColeEngineering.ca](mailto:POsika@ColeEngineering.ca)  
 Website: [www.ColeEngineering.ca](http://www.ColeEngineering.ca)

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**Melody Brown**

---

**From:** Tam, Cynthia [CTam@markham.ca]  
**Sent:** Tuesday, March 19, 2013 2:34 PM  
**To:** Melody Brown; Geoff Masotti  
**Subject:** RE: Comments on Markham Stormwater Management Facilities Retrofit EA  
**Attachments:** 283 - 76-78 - 10 - DELHI CRES (STA 1+25 TO 3+50).TIF; 283 - 76-78 - 04 - NORMANDALE RD (STA 0+00 TO 1+50).TIF; 283 - 76-78 - 05 - NORMANDALE RD (STA 1+50 TO 3+25).TIF; 283 - 76-78 - 06 - NORMANDALE RD (STA 3+25 TO 5+25).TIF; 283 - 76-78 - 07 - NORMANDALE RD (STA 5+25 TO 6+75).TIF; 283 - 76-78 - 08 - NORMANDALE RD (STA 6+75 TO 9+19.488).TIF; 283 - 76-78 - 09 - DELHI CRES (STA 0+00 TO 1+25).TIF

Hello Melody:

Unfortunately we have no tributary area plan nor the grading plan. All we have are some plan and profiles (see attached and the next email). This subdivision has been assumed.

Regards,

Cynthia Tam, M.Eng., P.Eng., PMP  
**Environmental Engineer**  
**Asset Management Department**  
**City of Markham . 8100 Warden Ave . Markham . Ontario . L6G 1B4**  
**e: ctam@markham.ca . t: 905.477.7000 x 2357 . f: 905.479.7766**

---

**From:** Melody Brown [mailto:MBrown@coleengineering.ca]  
**Sent:** March 19, 2013 2:03 PM  
**To:** Tam, Cynthia; Geoff Masotti  
**Subject:** RE: Comments on Markham Stormwater Management Facilities Retrofit EA

Cynthia,

Thank you for this information. Are there any other drawings available that are associated with this pond or the subdivision (perhaps a drainage area plan)? Also is this pond assumed by the City?

Thank you,

Melody Brown, B.Eng., E.I.T. (formerly Melody Giles)  
 Water Resources Designer  
 Environmental Sciences & Engineering

**Cole Engineering Group Ltd.**  
 70 Valleywood Drive, Markham, ON Canada L3R 4T5  
 T: 905-940-6161 Ext. 328 Tor. Line: 416-987-6161  
 F: 905-940-2064  
 E: [MBrown@ColeEngineering.ca](mailto:MBrown@ColeEngineering.ca)  
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---

**From:** Tam, Cynthia [mailto:CTam@markham.ca]  
**Sent:** Tuesday, March 19, 2013 1:48 PM



**To:** Geoff Masotti  
**Cc:** Melody Brown  
**Subject:** RE: Comments on Markham Stormwater Management Facilities Retrofit EA

Hi Geoff:

I have received new information today regarding the mentioned pond and it's a different story that I heard yesterday. Please see attached drawing for your reference. We do not have any associated SWM Report, but seems like it's a detention pond for sediment control that I believe does not meet current SWM standards. Please see if this will change the priority.

Regards,

Cynthia Tam, M.Eng., P.Eng., PMP  
**Environmental Engineer**  
**Asset Management Department**  
**City of Markham . 8100 Warden Ave . Markham . Ontario . L6G 1B4**  
**e: [ctam@markham.ca](mailto:ctam@markham.ca) . t: 905.477.7000 x 2357 . f: 905.479.7766**

---

**From:** Geoff Masotti [<mailto:GMasotti@coleengineering.ca>]  
**Sent:** March 18, 2013 4:27 PM  
**To:** Tam, Cynthia  
**Cc:** Melody Brown  
**Subject:** RE: Comments on Markham Stormwater Management Facilities Retrofit EA

Thanks for the confirmation Cynthia, that's what I suspected. We'll respond directly to the resident if that's okay with you.

Regards,

**Geoff Masotti, P.Eng.**  
**Water Resources, Associate**

***Cole Engineering Group Ltd.***  
***70 Valleywood Drive, Markham, ON Canada L3R 4T5***  
***T: 905-940-6161 Ext. 254 Tor. Line: 416-987-6161***  
***C: 416-230-9222 F: 905-940-2064***  
***E: [gmasotti@ColeEngineering.ca](mailto:gmasotti@ColeEngineering.ca)***  
***[www.ColeEngineering.ca](http://www.ColeEngineering.ca)***

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**From:** Tam, Cynthia [<mailto:CTam@markham.ca>]  
**Sent:** Monday, March 18, 2013 4:26 PM  
**To:** Geoff Masotti  
**Cc:** Melody Brown  
**Subject:** RE: Comments on Markham Stormwater Management Facilities Retrofit EA

Hi Geoff:

The pond near 59 Normandale Road is a natural wetland, not a SWM facility.

Thanks!

Cynthia Tam, M.Eng., P.Eng., PMP  
**Environmental Engineer**  
**Asset Management Department**  
**City of Markham . 8100 Warden Ave . Markham . Ontario . L6G 1B4**  
**e: ctam@markham.ca . t: 905.477.7000 x 2357 . f: 905.479.7766**

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**From:** Geoff Masotti [mailto:GMasotti@coleengineering.ca]  
**Sent:** March 18, 2013 11:04 AM  
**To:** Tam, Cynthia  
**Cc:** Melody Brown  
**Subject:** FW: Comments on Markham Stormwater Management Facilities Retrofit EA

Hi Cynthia,

In response to the below email:

The first part is really just due to the clutter of sites on the map. We'll clarify the point with the stakeholder but the map is correct.

We'll acknowledge the second point and commit to making the maps consistent.

We don't have any data regarding the pond mentioned in the email. Are you able to confirm what this site is? We believe the pond in question is located at Uncontrolled Outlet 105 on the Priority Sites map. We looked at the site and it appears as though the pond is a marsh area that spills over into an adjacent marsh area. Do you know if this is actually a SWM Pond owned and operated by the City?

Regards,

**Geoff Masotti, P.Eng.**  
**Water Resources, Associate**

***Cole Engineering Group Ltd.***  
***70 Valleywood Drive, Markham, ON Canada L3R 4T5***  
*T: 905-940-6161 Ext. 254 Tor. Line: 416-987-6161*  
*C: 416-230-9222 F: 905-940-2064*  
*E: [gmasotti@ColeEngineering.ca](mailto:gmasotti@ColeEngineering.ca)*  
*[www.ColeEngineering.ca](http://www.ColeEngineering.ca)*

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**From:** Peter Miasek [mailto:peter.miasek@rogers.com]  
**Sent:** Saturday, March 16, 2013 6:11 PM  
**To:** ctam@markham.ca; Markham Pond EA  
**Subject:** Comments on Markham Stormwater Management Facilities Retrofit EA

Cynthia and Geoff.....I attended the PIC on March 5 and spoke to the engineers. I support the objectives of the project, but have questions about the details. To groundtruth the information, I looked at the locations near my house on Normandale Road. I have three questions.

1. Although hard to read, the Study Overview map shows 6 uncontrolled outlets and zero storm water management facilities, yet 7 numbers are shown on this map – 100, 101, 102, 103, 104, 105, 106. Please explain the discrepancy.
2. The map with "Priority Sites Evaluated for Preferred Retrofit" identifies 3 selected uncontrolled outlets in this area – 106, 105, 112. Why is this numbering system different from the earlier map? Isn't this a recipe for

confusion and error?

3. I always assumed that the small pond east of 59(?) Normandale was a storm water pond. Is it?

Following your response to these questions, I may have more points to raise.

Thanks for your response.

Peter Miasek  
34 Normandale Rd.

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**Melody Brown**

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**From:** Geoff Masotti  
**Sent:** Friday, December 21, 2012 2:10 PM  
**To:** Patricia Osika  
**Cc:** Alan Manlucu; Melody Giles  
**Subject:** Fw: Pond Retrofit Study 1  
**Follow Up Flag:** Follow up  
**Flag Status:** Red  
**Attachments:** Major Buttons Drainage.zip

Guys,

See below

Geoff Masotti, P.Eng.  
Project Manager, Water Resources  
Cole Engineering Group Ltd.  
line: 905-940-6161 ext. 254  
cell: 416-230-9222  
gmasotti@ColeEngineering.ca

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Sent using BlackBerry

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**From:** Tam, Cynthia [mailto:CTam@markham.ca]  
**Sent:** Friday, December 21, 2012 02:07 PM  
**To:** Geoff Masotti  
**Subject:** RE: Pond Retrofit Study 1

Hi Geoff:

I finally received information from engineering regarding your query regarding some locations. Please see below my feedback in red.

---

**From:** Geoff Masotti [mailto:GMasotti@coleengineering.ca]  
**Sent:** October 24, 2012 2:51 PM  
**To:** Tam, Cynthia  
**Subject:** Pond Retrofit Study

Hi Cynthia,

We're just about complete the screening for the pond locations and uncontrolled outlets. There are a few points that we'd like to clarify with the City in order to determine if a few of these sites should be carried forward for consideration. These are:

1. The industrial/commercial areas at Addiscott Crt and Bodington Court – is the City aware if there on site controls associated with these developments?  
**On-site control for site plan: 80% TSS removal, 100 Year controlled to 2 Year**
2. The development at Glenburn Forest Way appears fairly recent – Is the City aware if any controls (other than ponds) were provided for this development?  
**No SWM Pond nor on-site control. Discharge directly to creek.**
3. Does the City have any information related to the Toogood Pond – What is this ponds function?  
**Toogood Pond is an online pond for recreation purposes. It is not intended for quantity or quality control.**
4. Can drainage area plans be provided for the development at Squire Baker's Lane and Major Buttons Drive?  
**See attached and the separate email (file size too big)**
5. On page 9 of the 1999 Retrofit Study, can any details be provided for the development draining to outlet #6? There is no sewer information provided for this area and it appears to be a private industrial site.  
**See Figure 3 in separate email (file size too big)**

Regards,

**Geoff Masotti, P.Eng.**  
**Water Resources, Associate**

**Cole Engineering Group Ltd.**  
**70 Valleywood Drive, Markham, ON Canada L3R 4T5**  
T: 905-940-6161 Ext. 254 Tor. Line: 416-987-6161  
C: 416-230-9222 F: 905-940-2064  
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[www.ColeEngineering.ca](http://www.ColeEngineering.ca)

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## **APPENDIX B**

### **Vegetation Investigations and Classification**

# Vegetation Survey - Initial Desktop Screening of Ponds

October 2012

| Pond ID | Survey Needed (Y/N/Questionable) | Reasoning                                            |
|---------|----------------------------------|------------------------------------------------------|
| 1       | Yes                              | Significant forest patch south of pond               |
| 2       | Questionable                     | Urban Area but appears to be some natural vegetation |
| 3       | Questionable                     | Urban Area but appears to be some natural vegetation |
| 4       | Yes                              | Potential Wetland Habitat                            |
| 5       | No                               | Cultural mowed area                                  |
| 6       | No                               | Cultural park                                        |
| 8       | No                               | Urban Area                                           |
| 9       | No                               | Urban area                                           |
| 11      | No                               | Cultural urban area                                  |
| 12      | No                               | Cultural park                                        |
| 13      | No                               | Urban park                                           |
| 14      | No                               | Cultural park                                        |
| 15      | No                               | Cultural park                                        |
| 16      | Yes                              | Significant Forest Patch east of pond                |
| 17      | No                               | Cultural park                                        |
| 18      | No                               | Parking lot and buildings                            |
| 19      | No                               | Cultural park                                        |
| 20      | No                               | Cultural meadow                                      |
| 21      | No                               | Cultural meadow                                      |
| 23      | No                               | Cultural park                                        |
| 24      | Yes                              | Significant forest patch                             |
| 30      | No                               | Newly constructed SWM ponds                          |
| 31      | No                               | Cultural park                                        |
| 32      | No                               | Cultural park                                        |
| 33      | No                               | Cultural park                                        |
| 34      | No                               | Cultural park                                        |
| 35      | No                               | Cultural park                                        |
| 36      | No                               | neighbourhood park                                   |
| 37      | No                               | Cultural meadow                                      |
| 38      | Yes                              | Significant Forest                                   |
| 39      | Yes                              | River corridor                                       |
| 41      | No                               | Cultural park                                        |
| 42      | Yes                              | Wetland                                              |
| 43      | Questionable                     | Forest cover to NW                                   |
| 45      | Questionable                     | Wetland                                              |
| 46      | No                               | Cultural meadow                                      |
| 47      | Yes                              | Surrounded by forest                                 |
| 48      | Yes                              | Significant forest to south east                     |
| 49      | Yes                              | Significant forest                                   |
| 50      | Yes                              | Significant forest                                   |
| 51      | Yes                              | Significant forest surrounding                       |
| 52      | Yes                              | Potential forest buffer                              |
| 53      | No                               | Cultural park                                        |
| 55      | Yes                              | Forest                                               |
| 56      | Yes                              | Forest                                               |
| 57      | No                               | Cultural park                                        |
| 59      | No                               | Cultural park                                        |
| 60      | No                               | Cultural park                                        |
| 61      | No                               | Urban Area                                           |
| 62      | No                               | Newly constructed SWM ponds                          |
| 63      | No                               | Cultural park                                        |
| 64      | No                               | Cultural park                                        |
| 65      | No                               | Cultural park                                        |

|    |     |                             |
|----|-----|-----------------------------|
| 66 | No  | Cultural park               |
| 67 | No  | Newly constructed SWM ponds |
| 68 | No  | Cultural park               |
| 69 | No  | Urban Area                  |
| 70 | Yes |                             |
| 71 | No  | Urban Area                  |
| 72 | No  | Cultural meadow             |
| 73 | No  | Cultural meadow             |
| 74 | Yes | Significant forest to north |
| 75 | No  | Cultural park               |
| 76 | No  | Cultural park               |
| 77 | No  | Cultural park               |
| 78 | No  | Cultural meadow             |



# Vegetation Survey - Initial Desktop Screening of Uncontrolled Outlets

October 2012

| Pond ID | Survey Needed (Y/N/Questionable) | Reasoning                                            |
|---------|----------------------------------|------------------------------------------------------|
| 3       | Yes                              | wooded site                                          |
| 5       | Yes                              | wooded site                                          |
| 6       | Yes                              | wooded site                                          |
| 9       | yes                              | wetland looking area                                 |
| 11      | yes                              | natural setting                                      |
| 12      | yes                              | wooded site                                          |
| 13      | yes                              | wooded site                                          |
| 0       | questionable                     | been near there before but very naturalized          |
| 7       | questionable                     | natural area but looks like meadow with small buffer |
| 8       | questionable                     | natural area but looks like meadow with small buffer |
| 10      | questionable                     | natural park setting                                 |
| 14      | questionable                     | been there before                                    |
| 1       | no                               | urban area                                           |
| 2       | no                               | cultural meadow                                      |
| 4       | no                               | cultural park                                        |

Cole Engineering Group Ltd. (Cole Engineering) undertook a vegetation survey during the weeks of October 15 to 19, 2012 and October 22 to 26, 2012. The purpose of this study was to classify the surrounding vegetation communities of the existing stormwater management (SWM) facilities and uncontrolled area outlets.

In phase two of the vegetation survey each site (that was not screened out in phase one) was visited and classified using the Ecological Classification of Southern Ontario (ELC) guidelines (Lee, 1998). As no in-depth soil analysis was taken at each site, the areas are classified to the ELC Community Series. Community series are distinguished based on the type of vegetation cover or the plant form that characterizes the community. The dominant plant species are included as well as a general soil series as found in the Soils of York Region Report published by the Ontario Ministry of Food and Rural Affairs.

## 1.0 Current Storm Water Management Facilities

### 1.1 SWM Pond 1

The general soil conditions of the area were determined through the use of the Soils of York Region Report published by the Ontario Ministry of Food and Rural Affairs. The study area was found consist of the soil series Cashel (Cac). This is a clay based soil that has good drainage has smooth and gently sloping topography with a stoniness class of stone free.

The existing vegetation in the area can broadly be broken down into four (4) categories. Refer to **Appendix – Vegetation Inspection** for photos illustrating the various vegetation categories within the study area.

The first (1<sup>st</sup>) vegetation community is a cultural meadow. Cultural Meadow is a cultural (non natural) type of habitat that is often found in urbanized, recently disturbed areas. It is made up of predominantly non-native species, which can either be mowed or left to grow naturally. This type of vegetation includes Goldenrods, Asters, Teasel, Queen Anne’s Lace, Milkweed and many other species that are often described as weeds.

The second (2<sup>nd</sup>) vegetation community is a thicket. Thickets have a low canopy tree cover but high understory density. These areas are often dominated by shrubs with a few canopy trees. These areas are also often found in urbanized areas and can contain a high amount of non-native species. Thicket species noted include European Buckthorn, Staghorn Sumac, Red Osier Dogwood, Willow sp., and Green Ash.

The third (3<sup>rd</sup>) vegetation community is woodland. Woodland is categorized as having a canopy tree cover between 35-60% with an understory of graminoids. This is a transitional vegetation category with the area probably transitioning from a cultural meadow to a forested site. The main canopy species in this section are Bur Oak, White Pine, and Green Ash. The understory is mainly cultural grass species but also includes goldenrods and asters, as well as other non-native species.

The fourth (4<sup>th</sup>) vegetation community is open water. This area is categorized as having no vegetation with water greater than 2 metres in depth.

Other notable features included a freshly chewed tree and a Beaver hut located on the west bank. Photos can be found in **Appendix C – Vegetation Photos**.

## 1.2 SWM Pond 2

The general soil conditions of the area were determined through the use of the Soils of York Region Report published by the Ontario Ministry of Food and Rural Affairs. The study area was found consist of the soil series Cashel (Cac). This is a clay based soil that has good drainage has smooth and gently sloping topography with a stoniness class of stone free.

The existing vegetation in the area can broadly be broken down into three (3) categories. Refer to **Appendix – Vegetation Inspection** for photos illustrating the various vegetation categories within the study area.

The first (1<sup>st</sup>) vegetation community is a cultural meadow. Cultural Meadow is a cultural (non natural) type of habitat that is often found in urbanized, recently disturbed areas. It is made up of predominantly non-native species, which can either be mowed or left to grow naturally. This type of vegetation includes Goldenrods, Asters, Teasel, Queen Anne’s Lace, Milkweed and many other species that are often described as weeds.

The second (2<sup>nd</sup>) vegetation community is a thicket. Thickets have a low canopy tree cover but high understory density. These areas are often dominated by shrubs with a few canopy trees. These areas are also often found in urbanized areas and can contain a high amount of non-native species. Thicket species noted include European Buckthorn, Staghorn Sumac, Red Osier Dogwood, Willow sp., and Green Ash.

The third (3<sup>rd</sup>) vegetation community is a Shallow Marsh community. Shallow Marshes have standing water less than 2 metres present for most of the year. The marsh was dominated by Cattails and Phragmites.

## 1.3 SWM Pond 3

The general soil conditions of the area were determined through the use of the Soils of York Region Report published by the Ontario Ministry of Food and Rural Affairs. The study area was found to consist of the soil series Peel (Pec) & Malton (Mac). The Peel series is a clay based soil that is imperfectly drained and is smooth and very gently sloping with a stoniness class of stone free. The Malton series is a clay based soil that is poorly drained and is also smooth and very gently sloping with a stoniness class of stone free.

The existing vegetation in the area can broadly be broken down into three (3) categories. Refer to **Appendix – Vegetation Inspection** for photos illustrating the various vegetation categories within the study area.

The first (1<sup>st</sup>) vegetation community is a cultural meadow. Cultural Meadow is a cultural (non natural) type of habitat that is often found in urbanized, recently disturbed areas. It is made up of predominantly non-native species, which can either be mowed or left to grow naturally. This type of vegetation includes Goldenrods, Asters, Teasel, Queen Anne’s Lace, Milkweed and many other species that are often described as weeds.

The second (2<sup>nd</sup>) vegetation community is a thicket. Thickets have a low canopy tree cover but high understory density. These areas are often dominated by shrubs with a few canopy trees. These areas are also often found in urbanized areas and can contain a high amount of non-native species. Thicket species noted include European Buckthorn, Staghorn Sumac, Red Osier Dogwood, Willow sp., and Green Ash.

The third (3<sup>rd</sup>) vegetation community is a Shallow Marsh community. Shallow Marshes have standing water less than 2 metres present for most of the year. The marsh was dominated by Cattails and Phragmites.

## 1.4 SWM Pond 4

The general soil conditions of the area were determined through the use of the Soils of York Region Report published by the Ontario Ministry of Food and Rural Affairs. The study area was found to consist of the soil series Peel (Pec) & Malton (Mac). The Peel series is a clay based soil that is imperfectly drained and is smooth and very gently sloping with a stoniness class of stone free. The Malton series is a clay based soil that is poorly drained and is also smooth and very gently sloping with a stoniness class of stone free.

The existing vegetation in the area can broadly be broken down into three (3) categories. Refer to **Appendix – Vegetation Inspection** for photos illustrating the various vegetation categories within the study area.

The first (1<sup>st</sup>) vegetation community is a cultural meadow. Cultural Meadow is a cultural (non natural) type of habitat that is often found in urbanized recently disturbed areas. It is made up of predominantly non-native species, which can either be mowed or left to grow naturally. This type of vegetation includes Goldenrods, Asters, Teasel, Queen Anne's Lace, Milkweed and many other species that are often described as weeds.

The second (2<sup>nd</sup>) vegetation community is a Marsh community class. Specifically there are multiple smaller marsh community series along the moisture gradient moving away from the pond. These range from shallow marsh (standing water less than 2 metres present for most of the year, cattail and Soft-stemmed bulrush dominated) to meadow marsh (seasonal flooding occurring in the spring but dry to moist by the summer, Phragmites dominated).

The third (3<sup>rd</sup>) vegetation community is open water. This area is categorized as having no vegetation with water greater than 2 metres in depth.

## 1.5 SWM Pond 16

The general soil conditions of the area were determined through the use of the Soils of York Region Report published by the Ontario Ministry of Food and Rural Affairs. The study area was found consist of the soil series Milliken (MI). This is a loam based soil that is imperfectly drained has smooth moderately and gently sloping topography with a stoniness class of few stones.

The existing vegetation in the area can broadly be broken down into three (3) categories. Refer to **Appendix – Vegetation Inspection** for photos illustrating the various vegetation categories within the study area.

The first (1<sup>st</sup>) and largest vegetation community is a cultural meadow. Cultural Meadow is a cultural (non natural) type of habitat that is often found in urbanized recently disturbed areas. It is made up of predominantly non-native species, which can either be mowed or left to grow naturally. This type of vegetation includes Goldenrods, Asters, Teasel, Queen Anne's Lace, Milkweed and many other species that are often described as weeds.

The second (2<sup>nd</sup>) vegetation community is a deciduous forest. Deciduous forests have tree cover greater than 60% with deciduous species having a 75% and greater canopy cover. This deciduous forest has a dominate Crack Willow canopy with an understory of Manitoba Maple, Green Ash, Silver Maple, and Trembling Aspen.

The third (3<sup>rd</sup>) vegetation community is a marsh. These marsh patches are small and localized with a dominate cover of Cattails.

## 1.6 SWM Pond 24

The general soil conditions of the area were determined through the use of the Soils of York Region Report published by the Ontario Ministry of Food and Rural Affairs. The study area was found consist of the soil series Peel (Pec). The Peel series is a clay based soil that is imperfectly drained and is smooth and very gently sloping with a stoniness class of stone free.

The existing vegetation in the area can broadly be described as a deciduous forest. Deciduous forests have tree cover greater than 60% with deciduous species having a 75% and greater canopy cover. This deciduous forest has a Willow and Manitoba Maple canopy with Red Osier Dogwood and European Buckthorn understory. Refer to **Appendix – Vegetation Inspection** for photos.

## 1.7 SWM Pond 38

The general soil conditions of the area were determined through the use of the Soils of York Region Report published by the Ontario Ministry of Food and Rural Affairs. The study area was found consist of the soil series Bottom Land (B.L.). The Bottom Land series is a variable type of alluvial soil that is variably drained and is smooth and very gently sloping with a stoniness class of stone free.

The existing vegetation in the area can broadly be broken down into three (3) categories. Refer to **Appendix – Vegetation Inspection** for photos illustrating the various vegetation categories within the study area.

The first (1<sup>st</sup>) vegetation community is a thicket. Thickets have a low canopy tree cover, but high understory density. These areas are often dominated by shrubs with a few canopy trees. These areas are also often found in urbanized areas and can contain a high amount of non-native species. Thicket species noted include European Buckthorn, Red Osier Dogwood, Willow sp., and Green Ash.

The second (2<sup>nd</sup>) vegetation community is a deciduous forest. Deciduous forests have tree cover greater than 60% with deciduous species having a 75% and greater canopy cover. This deciduous forest has a Sugar Maple canopy with Trembling Aspen and Basswood species.

The third (3<sup>rd</sup>) vegetation community is a Shallow Marsh community. Shallow Marshes have standing water less than 2 metres present for most of the year. The marsh was dominated by Cattails.

## 1.8 SWM Pond 39

The general soil conditions of the area were determined through the use of the Soils of York Region Report published by the Ontario Ministry of Food and Rural Affairs. The study area was found consist of the soil series Bottom Land (B.L.). The Bottom Land series is a variable type of alluvial soil that is variably drained and is smooth and very gently sloping with a stoniness class of stone free.

The existing vegetation in the area can broadly be broken down into three (3) categories. Refer to **Appendix – Vegetation Inspection** for photos illustrating the various vegetation categories within the study area.

The first (1<sup>st</sup>) vegetation community is a Shallow Marsh community. Shallow Marshes have standing water less than 2 metres present for most of the year. The marsh was dominated by Cattails with Spotted Joe Pye Weed and Red Osier Dogwood also present.

The second (2<sup>nd</sup>) vegetation community is a cultural meadow. Cultural Meadow is a cultural (non natural) type of habitat that is often found in urbanized recently disturbed areas. It is made up of predominantly non-native species, which can either be mowed or left to grow naturally. This type of vegetation includes Goldenrods, Asters, Teasel, Queen Anne’s Lace, Milkweed and many other species that are often described as weeds.

The third (3<sup>rd</sup>) community is a Coniferous forest. Coniferous forests are described as tree cover greater than 60% with 75% of the canopy being coniferous. White Cedar was the dominant species in this coniferous forest.

## 1.9 SWM Pond 42

The general soil conditions of the area were determined through the use of the Soils of York Region Report published by the Ontario Ministry of Food and Rural Affairs. The study area was found consist of the soil series Bottom Land (B.L.). The Bottom Land series is a variable type of alluvial soil that is variably drained and is smooth and very gently sloping with a stoniness class of stone free.

The existing vegetation in the area can broadly be broken down into four (4) categories. Refer to **Appendix – Vegetation Inspection** for photos illustrating the various vegetation categories within the study area.

The first (1<sup>st</sup>) vegetation community is a Shallow Marsh community. Shallow Marshes have standing water less than 2 metres present for most of the year. The marsh was dominated by Cattails with Spotted Joe Pye Weed, Red Osier Dogwood, and Beggarticks also present.

The second (2<sup>nd</sup>) vegetation community is a cultural meadow. Cultural Meadow is a cultural (non natural) type of habitat that is often found in urbanized recently disturbed areas. It is made up of predominantly non-native species, which can either be mowed or left to grow naturally. This type of vegetation includes Goldenrods, Asters, Teasel, Queen Anne’s Lace, Milkweed and many other species that are often described as weeds.

The third (3<sup>rd</sup>) vegetation community is a deciduous forest. Deciduous forests have tree cover greater than 60% with deciduous species having a 75% and greater canopy cover. This deciduous forest has a Trembling Aspen canopy with Weeping Willow and Silver Maple present.

The fourth (4<sup>th</sup>) vegetation community is open water. This area is categorized as having no vegetation with water greater than 2 metres in depth.

### 1.10 SWM Pond 43

The general soil conditions of the area were determined through the use of the Soils of York Region Report published by the Ontario Ministry of Food and Rural Affairs. The study area was found consist of the soil series Bottom Land (B.L.). The Bottom Land series is a variable type of alluvial soil that is variably drained and is smooth and very gently sloping with a stoniness class of stone free.

The existing vegetation in the area can broadly be broken down into three (3) categories. Refer to **Appendix – Vegetation Inspection** for photos illustrating the various vegetation categories within the study area.

The first (1<sup>st</sup>) vegetation community is a Shallow Marsh community. Shallow Marshes have standing water less than 2 metres present for most of the year. The marsh was dominated by Cattails with a few Willow shrubs present.

The second (2<sup>nd</sup>) vegetation community is a cultural meadow. Cultural Meadow is a cultural (non natural) type of habitat that is often found in urbanized recently disturbed areas. It is made up of predominantly non-native species, which can either be mowed or left to grow naturally. This type of vegetation includes Goldenrods, Asters, Teasel, Queen Anne's Lace, Milkweed and many other species that are often described as weeds.

The third (3<sup>rd</sup>) vegetation community is open water. This area is categorized as having no vegetation with water greater than 2 metres in depth.

### 1.11 SWM Pond 45

The general soil conditions of the area were determined through the use of the Soils of York Region Report published by the Ontario Ministry of Food and Rural Affairs. The study area was found consist of the soil series Woburn (Wol). The Woburn series is a loam type soil that has good drainage and is smooth and steeply sloping with a stoniness class of a few stones.

The existing vegetation in the area can broadly be broken down into two (2) categories. Refer to **Appendix – Vegetation Inspection** for photos illustrating the various vegetation categories within the study area.

The first (1<sup>st</sup>) vegetation community is a Shallow Marsh community. Shallow Marshes have standing water less than 2 metres present for most of the year. The marsh was dominated by Cattails with a few Willow and Red Osier Dogwood shrubs present.

The second (2<sup>nd</sup>) vegetation community is a cultural meadow. Cultural Meadow is a cultural (non natural) type of habitat that is often found in urbanized recently disturbed areas. It is made up of predominantly non-native species, which can either be mowed or left to grow naturally. This type of vegetation includes Goldenrods, Asters, Teasel, Queen Anne's Lace, Milkweed and many other species that are often described as weeds. This area is a culturally maintained park so it is dominated by mowed grass.

### 1.12 SWM Pond 47

The general soil conditions of the area were determined through the use of the Soils of York Region Report published by the Ontario Ministry of Food and Rural Affairs. The study area was found consist of the soil series Bottom Land (B.L.). The Bottom Land series is a variable type of alluvial soil that is variably drained and is smooth and very gently sloping with a stoniness class of stone free.

The existing vegetation in the area can broadly be broken down into two (2) categories. Refer to **Appendix – Vegetation Inspection** for photos illustrating the various vegetation categories within the study area.

The first (1<sup>st</sup>) vegetation community is a cultural meadow. Cultural Meadow is a cultural (non natural) type of habitat that is often found in urbanized recently disturbed areas. It is made up of predominantly non-native species, which can either be mowed or left to grow naturally. This type of vegetation includes Goldenrods, Asters, Teasel, Queen Anne’s Lace, Milkweed and many other species that are often described as weeds.

The second (2<sup>nd</sup>) vegetation community is open water. This area is categorized as having no vegetation with water greater than 2 metres in depth.

An important feature to this pond is the surrounding forest to the north and east of the pond. This is a well established mature deciduous forest that is acting as a buffer to the river system. It is made up of predominantly Sugar Maple trees with Basswood and Green Ash species also present. Care should be taken to preserve this forest as it appears to be connected to a larger patch of undisturbed forest corridor. Refer to **Appendix – Vegetation Inspection** for photos illustrating this area.

### 1.13 SWM Pond 48

The general soil conditions of the area were determined through the use of the Soils of York Region Report published by the Ontario Ministry of Food and Rural Affairs. The study area was found consist of the soil series Woburn (Wol). The Woburn series is a loam type soil that has good drainage and is smooth and steeply sloping few stones.

The existing vegetation in the area can broadly be broken down into two (2) categories. Refer to **Appendix – Vegetation Inspection** for photos illustrating the various vegetation categories within the study area.

The first (1<sup>st</sup>) vegetation community is a cultural meadow. Cultural Meadow is a cultural (non natural) type of habitat that is often found in urbanized recently disturbed areas. It is made up of predominantly non-native species, which can either be mowed or left to grow naturally. This type of vegetation includes Goldenrods, Asters, Teasel, Queen Anne’s Lace, Milkweed and many other species that are often described as weeds.

The second (2<sup>nd</sup>) vegetation community is open water. This area is categorized as having no vegetation with water greater than 2 metres in depth.

There were two (2) other notable features observed in the area of pond 48. The first (1<sup>st</sup>) was the presence of a Belted Kingfisher. A Belted Kingfisher is the only Kingfisher that is commonly found in Northern United States and



Canada. It is a stocky, medium sized bird that measures between 28-35cm. Its primary source of food is fish but they also eat amphibians, small crustaceans, insects, small mammals and reptiles. The species is not currently listed as a species at risk but the species is listed as a high-priority candidate wildlife species for consideration by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) because of the long-term, steepening declines due its specialized nesting habits and piscivorous (primarily fish eating) nature (<http://www.ec.gc.ca/soc-sbc/oiseau-bird-eng.aspx?sY=2011&sL=e&sM=p1&sB=BEKI>).

The second (2<sup>nd</sup>) notable feature was the mature mixed forest that surrounded pond 48. This mixed forest vegetation type is much older and more established than the surrounding area. It was comprised of a Sugar Maple Hardwood forest moving into a White Pine, Hemlock forest. There is little understory or ground cover due to the lack of light penetrating the tree canopy. There are also sub-canopy species such as Ash, Black Cherry, and Ironwood present. Care should be taken to preserve this forest as it contains large old growth White Pine and Hemlock trees and appears to be connected to a larger patch of undisturbed forest corridor. Refer to **Appendix – Vegetation Inspection** for photos illustrating this area.

### 1.14 SWM Pond 49

The general soil conditions of the area were determined through the use of the Soils of York Region Report published by the Ontario Ministry of Food and Rural Affairs. The study area was found consist of the soil series Milliken (MI). The Milliken series is a loam type soil that is imperfectly drained and is smooth and moderately to gently sloping with few stones.

The existing vegetation in the area can broadly be broken down into four (4) categories. Refer to **Appendix – Vegetation Inspection** for photos illustrating the various vegetation categories within the study area.

The first (1<sup>st</sup>) vegetation community is a cultural meadow. Cultural Meadow is a cultural (non natural) type of habitat that is often found in urbanized recently disturbed areas. It is made up of predominantly non-native species, which can either be mowed or left to grow naturally. This type of vegetation includes Goldenrods, Asters, Teasel, Queen Anne's Lace, Milkweed and many other species that are often described as weeds.

The second (2<sup>nd</sup>) vegetation community is thicket. Thickets have a low canopy tree cover, but high understory density. These areas are often dominated by shrubs with a few canopy trees. These areas are also often found in urbanized areas and can contain a high amount of non-native species. Thicket species noted include European Buckthorn, Red Osier Dogwood, Willow sp., and Staghorn Sumac.

The third (3<sup>rd</sup>) vegetation community is a Shallow Marsh community. Shallow Marshes have standing water less than 2 metres present for most of the year. The marsh was dominated by Cattails and Phragmites with a few Willow and Red Osier Dogwood shrubs present.

The fourth (4<sup>th</sup>) vegetation community is a deciduous forest. Deciduous forests have tree cover greater than 60% with deciduous species having a 75% and greater canopy cover. This deciduous forest appears to be an old plantation that has a mainly Basswood, Black Walnut, and Norway Spruce Canopy.

A notable feature in this pond area was the sighting of 2 deer that were observed in the deciduous forest vegetation community.

### 1.15 SWM Pond 50

The general soil conditions of the area were determined through the use of the Soils of York Region Report published by the Ontario Ministry of Food and Rural Affairs. The study area was found consist of the soil series Peel (Pec). The Peel series is a clay based soil that is imperfectly drained and is smooth and very gently sloping with a stoniness class of stone free.

The existing vegetation in the area can broadly be broken down into three (3) categories. Refer to **Appendix – Vegetation Inspection** for photos illustrating the various vegetation categories within the study area.

The first (1<sup>st</sup>) vegetation community is a Shallow Marsh community. Shallow Marshes have standing water less than 2 metres present for most of the year. The marsh was dominated by Cattails with a few Willow and Red Osier Dogwood shrubs present.

The second (2<sup>nd</sup>) vegetation community is a deciduous forest. Deciduous forests have tree cover greater than 60% with deciduous species having a 75% and greater canopy cover. This deciduous forest is dominated by American Beech trees with smaller amounts of Hawthorn and Staghorn Sumac.

The third (3<sup>rd</sup>) vegetation community is open water. This area is categorized as having no vegetation with water greater than 2 metres in depth.

### 1.16 SWM Pond 51

The general soil conditions of the area were determined through the use of the Soils of York Region Report published by the Ontario Ministry of Food and Rural Affairs. The study area was found consist of the soil series Woburn (Wol). The Woburn series is a loam type soil that has good drainage and is smooth and steeply sloping few stones.

The existing vegetation in the area can broadly be broken down into four (4) categories. Refer to **Appendix – Vegetation Inspection** for photos illustrating the various vegetation categories within the study area.

The first (1<sup>st</sup>) vegetation community is a cultural meadow. Cultural Meadow is a cultural (non natural) type of habitat that is often found in urbanized recently disturbed areas. It is made up of predominantly non-native species, which can either be mowed or left to grow naturally. This type of vegetation includes Goldenrods, Asters, Teasel, Queen Anne’s Lace, Milkweed and many other species that are often described as weeds.

The second (2<sup>nd</sup>) vegetation community is a Shallow Marsh community. Shallow Marshes have standing water less than 2 metres present for most of the year. The marsh was dominated by Cattails and Phragmites with a few Willow and Red Osier Dogwood shrubs present.

The third (3<sup>rd</sup>) vegetation community is a deciduous forest. Deciduous forests have tree cover greater than 60% with deciduous species having a 75% and greater canopy cover. This deciduous forest has a Sugar Maple – Red Oak canopy with American Beech, Green Ash, Basswood, and Ironwood present.

The fourth (4<sup>th</sup>) vegetation community is that of a Cultural Plantation. Cultural Plantations are similar to the Forest classification (greater than 60% tree covered), but are man-made. This plantation was a conifer plantation with a mix of Norway Spruce and White Cedar.

### 1.17 SWM Pond 52

The general soil conditions of the area were determined through the use of the Soils of York Region Report published by the Ontario Ministry of Food and Rural Affairs. The study area was found consist of the soil series Milliken (MI). The Milliken series is a loam type soil that is imperfectly drained and is smooth and moderately to gently sloping with few stones.

The existing vegetation in the area can broadly be broken down into three (3) categories. Refer to **Appendix – Vegetation Inspection** for photos illustrating the various vegetation categories within the study area.

The first (1<sup>st</sup>) vegetation community is a cultural meadow. Cultural Meadow is a cultural (non natural) type of habitat that is often found in urbanized recently disturbed areas. It is made up of predominantly non-native species, which can either be mowed or left to grow naturally. This type of vegetation includes Goldenrods, Asters, Teasel, Queen Anne's Lace, Milkweed and many other species that are often described as weeds. Part of this area is a manicured park and therefore the main species in this area is cultural-mowed grass.

The second (2<sup>nd</sup>) vegetation community is a deciduous forest. Deciduous forests have tree cover greater than 60% with deciduous species having a 75% and greater canopy cover. This deciduous forest has a Sugar Maple canopy with Black Walnut and European Larch also being present.

The third (3<sup>rd</sup>) vegetation community is open water. This area is categorized as having no vegetation with water greater than 2 metres in depth.

### 1.18 SWM Pond 55

The general soil conditions of the area were determined through the use of the Soils of York Region Report published by the Ontario Ministry of Food and Rural Affairs. The study area was found consist of the soil series Woburn (Wol). The Woburn series is a loam type soil that has good drainage and is smooth and steeply sloping few stones.

The existing vegetation in the area can broadly be broken down into three (3) categories. Refer to **Appendix – Vegetation Inspection** for photos illustrating the various vegetation categories within the study area.

The first (1<sup>st</sup>) vegetation community is a cultural meadow. Cultural Meadow is a cultural (non natural) type of habitat that is often found in urbanized recently disturbed areas. It is made up of predominantly non-native species, which can either be mowed or left to grow naturally. This type of vegetation includes Goldenrods, Asters, Teasel, Queen Anne’s Lace, Milkweed and many other species that are often described as weeds.

The second (2<sup>nd</sup>) vegetation community is a deciduous forest. Deciduous forests have tree cover greater than 60% with deciduous species having a 75% and greater canopy cover. This deciduous forest has a dominant Sugar Maple canopy with Ironwood, Manitoba Maple and Red Oak being present in the sub-canopy.

The third (3<sup>rd</sup>) vegetation community is open water. This area is categorized as having no vegetation with water greater than 2 metres in depth.

A notable feature in this pond area was the sighting of an American Mink that appeared multiple times in the larger pond. This suggests that this pond may be an important habitat feature for this individual.

### 1.19 SWM Pond 56

The general soil conditions of the area were determined through the use of the Soils of York Region Report published by the Ontario Ministry of Food and Rural Affairs. The study area was found consist of the soil series Milliken (MI). The Milliken series is a loam type soil that is imperfectly drained and is smooth and moderately to gently sloping with few stones.

The existing vegetation in the area can broadly be broken down into four (4) categories. Refer to **Appendix – Vegetation Inspection** for photos illustrating the various vegetation categories within the study area.

The first (1<sup>st</sup>) vegetation community is a cultural meadow. Cultural Meadow is a cultural (non natural) type of habitat that is often found in urbanized recently disturbed areas. It is made up of predominantly non-native species, which can either be mowed or left to grow naturally. This type of vegetation includes Goldenrods, Asters, Teasel, Queen Anne’s Lace, Milkweed and many other species that are often described as weeds.

The second (2<sup>nd</sup>) vegetation community is a Shallow Marsh community. Shallow Marshes have standing water less than 2 metres present for most of the year. The marsh was dominated by Cattails with a few Willow and Red Osier Dogwood shrubs present at the fringes.

The third (3<sup>rd</sup>) vegetation community is thicket. Thickets have a low canopy tree cover, but high understory density. These areas are often dominated by shrubs with a few canopy trees. These areas are also often found in urbanized areas and can contain a high amount of non-native species. Thicket species noted include European Alder, Red Osier Dogwood, Willow sp., and Staghorn Sumac.

The fourth (4<sup>th</sup>) vegetation community is open water. This area is categorized as having no vegetation with water greater than 2 metres in depth.

A notable feature about this area is its location. It is much less urbanized and is set much further away from development than many of the other ponds and therefore has very little human foot print. It is also part of the larger Rouge River Watershed buffer and therefore care should be taken to preserve this area.

## 1.20 SWM Pond 70

The general soil conditions of the area were determined through the use of the Soils of York Region Report published by the Ontario Ministry of Food and Rural Affairs. The study area was found consist of the soil series Woburn (Wol). The Woburn series is a loam type soil that has good drainage and is smooth and steeply sloping few stones.

The existing vegetation in the area can broadly be broken down into three (3) categories. Refer to **Appendix – Vegetation Inspection** for photos illustrating the various vegetation categories within the study area.

The first (1<sup>st</sup>) vegetation community is a cultural meadow. Cultural Meadow is a cultural (non natural) type of habitat that is often found in urbanized recently disturbed areas. It is made up of predominantly non-native species, which can either be mowed or left to grow naturally. This type of vegetation includes Goldenrods, Asters, Teasel, Queen Anne's Lace, Milkweed and many other species that are often described as weeds.

The second (2<sup>nd</sup>) vegetation community is a Shallow Marsh community. Shallow Marshes have standing water less than 2 metres present for most of the year. The marsh was dominated by Cattails and Phragmites with a few Willow and Red Osier Dogwood shrubs present at the fringes.

The third (3<sup>rd</sup>) vegetation community is open water. This area is categorized as having no vegetation with water greater than 2 metres in depth.

## 1.21 SWM Pond 74

The general soil conditions of the area were determined through the use of the Soils of York Region Report published by the Ontario Ministry of Food and Rural Affairs. The study area was found consist of the soil series Bottom Land (B.L.). The Bottom Land series is a variable type of alluvial soil that is variably drained and is smooth and very gently sloping with a stoniness class of stone free.

The existing vegetation in the area can broadly be broken down into three (3) categories. Refer to **Appendix – Vegetation Inspection** for photos illustrating the various vegetation categories within the study area.

The first (1<sup>st</sup>) vegetation community is a cultural meadow. Cultural Meadow is a cultural (non natural) type of habitat that is often found in urbanized recently disturbed areas. It is made up of predominantly non-native species, which can either be mowed or left to grow naturally. This type of vegetation includes Goldenrods, Asters, Teasel, Queen Anne's Lace, Milkweed and many other species that are often described as weeds.

The second (2<sup>nd</sup>) vegetation community is a mixed forest. Mixed forests have greater than 60% tree cover with deciduous and conifer species each having a canopy cover of greater than 25%. The make-up of this community is Scotts Pine, Green Ash, and Trembling Aspen.

The third (3<sup>rd</sup>) vegetation community is open water. This area is categorized as having no vegetation with water greater than 2 metres in depth.

## 2.0 Uncontrolled Storm Water Management Areas

### 2.1 Uncontrolled Area 163

The general soil conditions of the area were determined through the use of the Soils of York Region Report published by the Ontario Ministry of Food and Rural Affairs. The study area was found consist of the soil series Milliken (MI). The Milliken series is a loam type soil that is imperfectly drained and is smooth and moderately to gently sloping with few stones.

The existing vegetation in the area can broadly be classified as a Mixed Forest. Mixed forests have a tree cover that is greater than 60 percent with conifer and deciduous species both making up greater than 25 percent of the canopy. This Mixed forest is Crack Willow & White Cedar, with an understory of American Elm, Sugar Maple and Green Ash.

Refer to **Appendix – Vegetation Inspection** for photos illustrating this vegetation community.

### 2.2 Uncontrolled Area 103

The general soil conditions of the area were determined through the use of the Soils of York Region Report published by the Ontario Ministry of Food and Rural Affairs. The study area was found consist of the soil series Bottom Land (B.L.). The Bottom Land series is a variable type of alluvial soil that is variably drained and is smooth and very gently sloping with a stoniness class of stone free.

The existing vegetation in the area can broadly be broken down into three (3) categories. Refer to **Appendix – Vegetation Inspection** for photos illustrating the various vegetation categories within the study area.

The first (1<sup>st</sup>) vegetation community is a cultural meadow. Cultural Meadow is a cultural (non natural) type of habitat that is often found in urbanized recently disturbed areas. It is made up of predominantly non-native species, which can either be mowed or left to grow naturally. This type of vegetation includes Goldenrods, Asters,

Teasel, Queen Anne's Lace, Milkweed and many other species that are often described as weeds. Part of this area is a manicured park and therefore the main species in this area is cultural-mowed grass.

The second (2<sup>nd</sup>) vegetation community is a deciduous forest. Deciduous forests have tree cover greater than 60% with deciduous species having a 75% and greater canopy cover. This deciduous forest has a Silver Maple, White Ash, and Black Walnut canopy, with American Elm and Manitoba Maple making up the sub-canopy.

As the area currently already has a pond the third (3<sup>rd</sup>) vegetation community is open water. This area is categorized as having no vegetation with water greater than 2 metres in depth.

## 2.3 Uncontrolled Area 134

The general soil conditions of the area were determined through the use of the Soils of York Region Report published by the Ontario Ministry of Food and Rural Affairs. The study area was found consist of the soil series Peel (Pec). The Peel series is a clay based soil that is imperfectly drained and is smooth and very gently sloping with a stoniness class of stone free.

The existing vegetation in the area can broadly be broken down into two (2) categories. Refer to **Appendix – Vegetation Inspection** for photos illustrating the various vegetation categories within the study area.

The first (1<sup>st</sup>) vegetation community is a deciduous forest. Deciduous forests have tree cover greater than 60% with deciduous species having a 75% and greater canopy cover. This deciduous forest has a Bitternut Hickory canopy with Sugar Maple, Basswood, and American Beech also present.

The second (2<sup>nd</sup>) vegetation community can be classified as a Mixed Forest. Mixed forests have a tree cover that is greater than 60 percent with conifer and deciduous species both making up greater than 25 percent of the canopy. This Mixed forest is comprised of White Cedar and Yellow Birch. This is a more lowland lying area that occurs as you approach the stream.

There were two (2) other notable features observed in the area of pond 48. The first (1<sup>st</sup>) was the presence of an American Mink. The Mink was seen exiting the stream and running into the surrounding woods. This suggests that the stream and the surrounding area may be an important habitat feature for this individual.

The second notable feature observed was the presence of Bitternut Hickory trees at the site and how mature the forest appeared. Bitternut Hickory is a Carolinian Species that is more commonly found further south in Ontario. For an urbanized area, it was a well established forest community with little to no invasive species present. This type of habitat is rare in urbanized area therefore care should be taken to preserve this area.

## 2.4 Uncontrolled Area 106

The general soil conditions of the area were determined through the use of the Soils of York Region Report published by the Ontario Ministry of Food and Rural Affairs. The study area was found consist of the soil series Bottom Land (B.L.). The Bottom Land series is a variable type of alluvial soil that is variably drained and is smooth and very gently sloping with a stoniness class of stone free.

The existing vegetation in the area can broadly be broken down into two (2) categories. Refer to **Appendix – Vegetation Inspection** for photos illustrating the various vegetation categories within the study area.

The first (1<sup>st</sup>) vegetation community is a deciduous forest. Deciduous forests have tree cover greater than 60% with deciduous species having a 75% and greater canopy cover. This deciduous forest has a Willow canopy with Trembling Aspen and Manitoba Maple also present.

The second (2<sup>nd</sup>) vegetation community is a coniferous forest. Coniferous forests have tree cover greater than 60% with coniferous species having a 75% and greater canopy cover. This deciduous forest has a dominant White Cedar Canopy.

Notable features in this area included the discovery of two (2) Butternut Trees. Butternut is listed as an endangered species and therefore is protected under section 9 of the *Endangered Species Act 2007* (ESA). Section 9 includes prohibitions against activities such as killing, harming, taking, possessing, buying and selling a species listed as extirpated, endangered or threatened. Butternut prefers moist well-drained soils and is often found along streams growing alone or in small groups. Keeping this factor in mind, it is possible there could be other Butternut trees growing in this buffer area.

## 2.5 Uncontrolled Area 176

The general soil conditions of the area were determined through the use of the Soils of York Region Report published by the Ontario Ministry of Food and Rural Affairs. The study area was found consist of the soil series Bottom Land (B.L.). The Bottom Land series is a variable type of alluvial soil that is variably drained and is smooth and very gently sloping with a stoniness class of stone free.

The existing vegetation in the area can broadly be described as a cultural meadow. Cultural Meadow is a cultural (non natural) type of habitat that is often found in urbanized recently disturbed areas. It is made up of predominantly non-native species, which can either be mowed or left to grow naturally. This type of vegetation includes Goldenrods, Asters, Teasel, Queen Anne's Lace, Milkweed and many other species that are often described as weeds.

Refer to **Appendix – Vegetation Inspection** for photos illustrating the various vegetation categories within the study area.



## 2.6 Uncontrolled Area 112

The general soil conditions of the area were determined through the use of the Soils of York Region Report published by the Ontario Ministry of Food and Rural Affairs. The study area was found consist of the soil series Bottom Land (B.L.). The Bottom Land series is a variable type of alluvial soil that is variably drained and is smooth and very gently sloping with a stoniness class of stone free.

The existing vegetation in the area can broadly be described as a cultural meadow. Cultural Meadow is a cultural (non natural) type of habitat that is often found in urbanized recently disturbed areas. It is made up of predominantly non-native species, which can either be mowed or left to grow naturally. This type of vegetation includes Goldenrods, Asters, Teasel, Queen Anne's Lace, Milkweed and many other species that are often described as weeds.

Refer to **Appendix – Vegetation Inspection** for photos illustrating the various vegetation categories within the study area.

## 2.7 Uncontrolled Area 159

The general soil conditions of the area were determined through the use of the Soils of York Region Report published by the Ontario Ministry of Food and Rural Affairs. The study area was found consist of the soil series Bottom Land (B.L.). The Bottom Land series is a variable type of alluvial soil that is variably drained and is smooth and very gently sloping with a stoniness class of stone free.

The existing vegetation in the area can broadly be described as a Shallow Marsh community. Shallow Marshes have standing water less than 2 metres present for most of the year. The marsh was dominated by Cattails with a few Willow and Red Osier Dogwood shrubs present at the fringes. The area was also surrounded by a small Cultural Meadow.

Refer to **Appendix – Vegetation Inspection** for photos illustrating the various vegetation categories within the study area.

## 2.8 Uncontrolled Area 55

The general soil conditions of the area were determined through the use of the Soils of York Region Report published by the Ontario Ministry of Food and Rural Affairs. The study area was found consist of the soil series Bottom Land (B.L.). The Bottom Land series is a variable type of alluvial soil that is variably drained and is smooth and very gently sloping with a stoniness class of stone free.

The existing vegetation in the area can broadly be described as a cultural meadow. Cultural Meadow is a cultural (non natural) type of habitat that is often found in urbanized recently disturbed areas. It is made up of predominantly non-native species, which can either be mowed or left to grow naturally. This type of vegetation includes Goldenrods, Asters, Teasel, Queen Anne's Lace, Milkweed and many other species that are often described as weeds.

Refer to **Appendix – Vegetation Inspection** for photos illustrating the various vegetation categories within the study area.

## 2.9 Uncontrolled Area 162

The general soil conditions of the area were determined through the use of the Soils of York Region Report published by the Ontario Ministry of Food and Rural Affairs. The study area was found consist of the soil series Bottom Land (B.L.). The Bottom Land series is a variable type of alluvial soil that is variably drained and is smooth and very gently sloping with a stoniness class of stone free.

The existing vegetation in the area can broadly be described as a cultural meadow. Cultural Meadow is a cultural (non natural) type of habitat that is often found in urbanized recently disturbed areas. It is made up of predominantly non-native species, which can either be mowed or left to grow naturally. This type of vegetation includes Goldenrods, Asters, Teasel, Queen Anne's Lace, Milkweed and many other species that are often described as weeds.

Refer to **Appendix – Vegetation Inspection** for photos illustrating the various vegetation categories within the study area.

## 2.10 Uncontrolled Area 105

The general soil conditions of the area were determined through the use of the Soils of York Region Report published by the Ontario Ministry of Food and Rural Affairs. The study area was found consist of the soil series Bottom Land (B.L.). The Bottom Land series is a variable type of alluvial soil that is variably drained and is smooth and very gently sloping with a stoniness class of stone free.

The existing vegetation in the area can broadly be broken down into two (2) categories. Refer to **Appendix – Vegetation Inspection** for photos illustrating the various vegetation categories within the study area.

The first (1<sup>st</sup>) vegetation community is a deciduous forest. Deciduous forests have tree cover greater than 60% with deciduous species having a 75% and greater canopy cover. This deciduous forest has a Green Ash and Crack Willow canopy.

The third (2<sup>nd</sup>) vegetation community is a Shallow Marsh community. Shallow Marshes have standing water less than 2 metres present for most of the year. The marsh was dominated by Cattails.

As the area currently already has a pond the third (3<sup>rd</sup>) vegetation community is open water. This area is categorized as having no vegetation with water greater than 2 metres in depth.

## 2.11 Uncontrolled Area 67

The general soil conditions of the area were determined through the use of the Soils of York Region Report published by the Ontario Ministry of Food and Rural Affairs. The study area was found consist of the soil series Bottom Land (B.L.). The Bottom Land series is a variable type of alluvial soil that is variably drained and is smooth and very gently sloping with a stoniness class of stone free.

The existing vegetation in the area can broadly be classified as a Mixed Forest. Mixed forests have a tree cover that is greater than 60 percent with conifer and deciduous species both making up greater than 25 percent of the canopy. This Mixed forest is Sugar Maple with Norway Spruce and White Pine.

Refer to **Appendix – Vegetation Inspection** for photos illustrating this vegetation community.

## 2.12 Uncontrolled Area 8

The general soil conditions of the area were determined through the use of the Soils of York Region Report published by the Ontario Ministry of Food and Rural Affairs. The study area was found consist of the soil series Bottom Land (B.L.). The Bottom Land series is a variable type of alluvial soil that is variably drained and is smooth and very gently sloping with a stoniness class of stone free.

The existing vegetation in the area can broadly be classified as a deciduous forest. Deciduous forests have a tree cover that is greater than 60 percent with deciduous species making up greater than 75 percent of the canopy. This forest has a canopy of Manitoba Maple and Willow species.

Refer to **Appendix – Vegetation Inspection** for photos illustrating this vegetation community.

## 3.0 References

Lee, H.W. (1998). *Ecological Land Classification for Southern Ontario: First Approximation and Its Application*. North Bay: Ontario Ministry of Natural Resources.

## **Vegetation Survey Site Photos**



**Figure 1. SWM Pond 1 - Cultural Meadow**



**Figure 2. SWM Pond 1 – Thicket**





**Figure 3. SWM Pond 1 - Woodland**



**Figure 4. SWM Pond 1 - Beaver Hut**



**Figure 5. SWM Pond 2 - Cultural Meadow**



**Figure 6. SWM Pond 2 – Thicket**





**Figure 7. SWM Pond 2 - Shallow Wetland**



**Figure 8. SWM Pond 3 - Cultural Meadow**





**Figure 9. SWM Pond 3 – Thicket**



**Figure 10. SWM Pond 3 - Shallow Marsh**



**Figure 11. SWM Pond 4 - Cultural Meadow**



**Figure 12. SWM Pond 4 - Marsh Community**





**Figure 13. SMW Pond 16 - Cultural Meadow**



**Figure 14. SWM Pond 16 - Deciduous Forest**



**Figure 15. SWM Pond 16 - Marsh Community**



**Figure 16. SWM Pond 24 - Thicket Community**





**Figure 17. SWM Pond 38 - Thicket Community**



**Figure 18. SWM Pond 38 - Shallow Marsh Foreground - Deciduous Forest Behind**





**Figure 19. SWM Pond 39 - Shallow Marsh**



**Figure 20. SWM Pond 39 - Cultural Meadow**



**Figure 21. SWM Pond 39 - Coniferous Forest**



**Figure 22. SWM Pond 42 - Cultural Meadow Foreground - Shallow Marsh Behind**





**Figure 23. SWM Pond 42 - Deciduous Forest**



**Figure 24. SWM Pond 43 - Shallow Marsh**





**Figure 25. SWM Pond 43 - Cultural Meadow**



**Figure 26. SWM Pond 45 - Cultural Meadow**



**Figure 27. SWM Pond 45 - Shallow Marsh**



**Figure 28. SWM Pond 47 - Cultural Meadow**





**Figure 29. SWM Pond 47 - Hardwood Forest**



**Figure 30. SWM Pond 48 - Cultural Meadow**



**Figure 31. SWM Pond 48 - Mature Hardwood Forest**





**Figure 32. SWM Pond 48 - Mature White Pine & Hemlock Forest**



**Figure 33. SWM Pond 49 - Cultural Meadow**



**Figure 34. SWM Pond 49 – Thicket**



**Figure 35. SWM Pond 49 - Shallow Marsh**





**Figure 36. SWM Pond 49 - Mixed Forest**

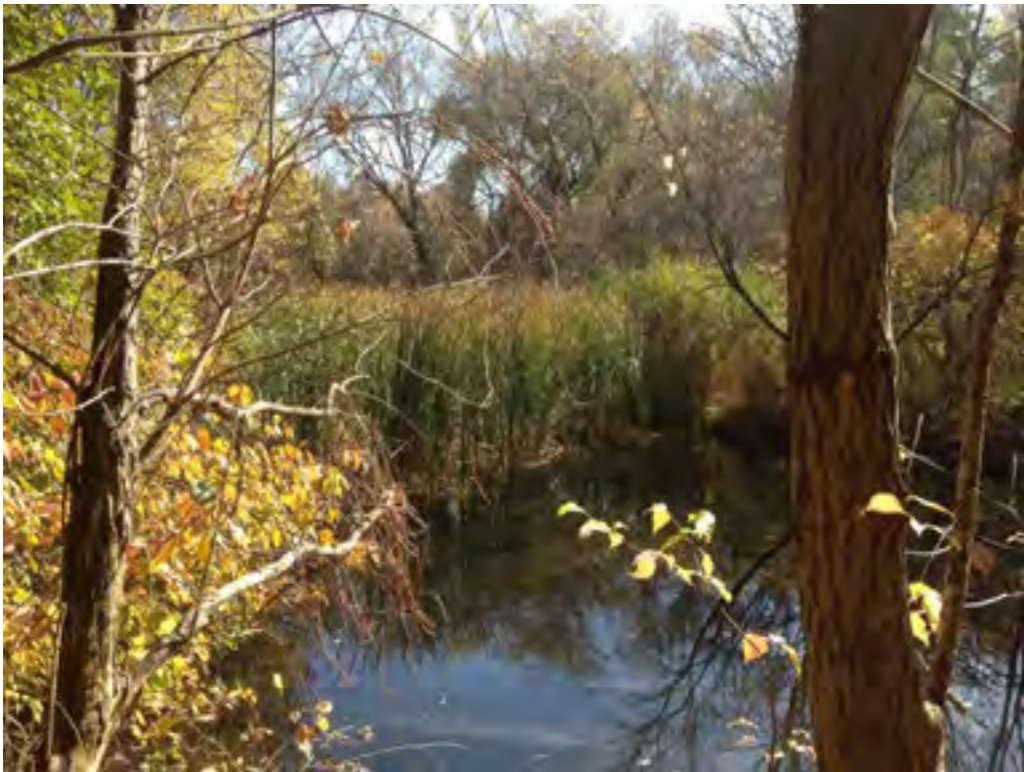


**Figure 37. SWM Pond 50 - Shallow Marsh**



**Figure 38. SWM Pond 50 - Deciduous Forest**



**Figure 39. SWM Pond 51 - Cultural Meadow**





**Figure 40. SWM Pond 51 - Shallow Marsh**

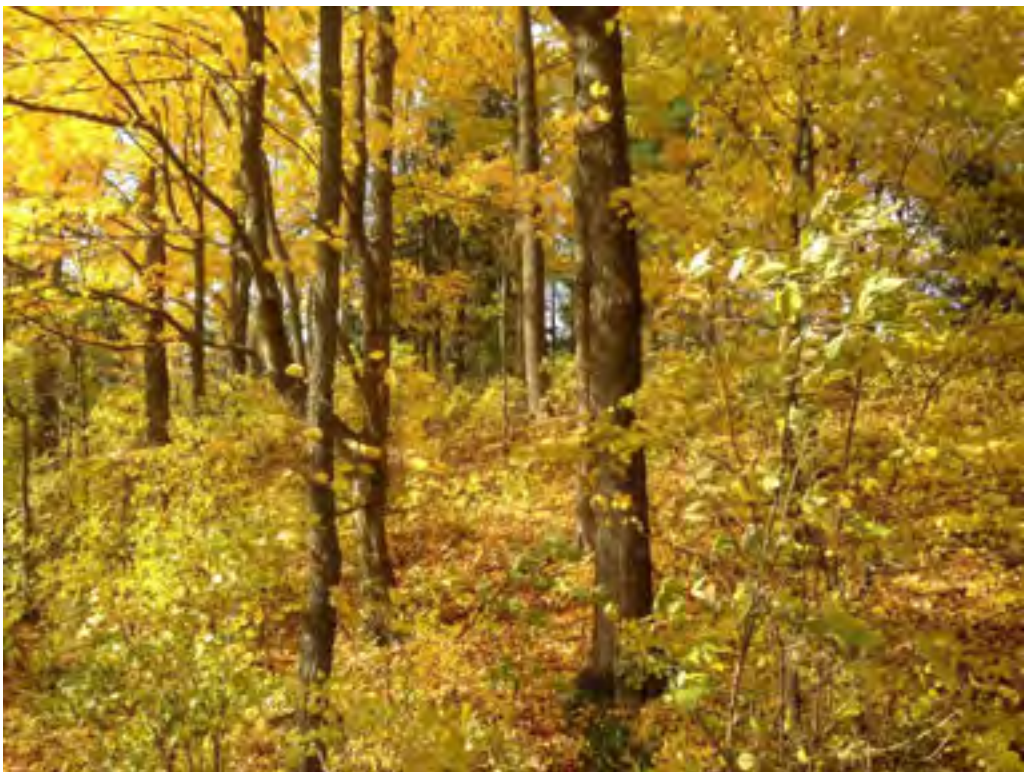


**Figure 41. SWM Pond 51 - Deciduous Forest**



**Figure 42. SWM Pond 51 - Cultural Plantation**



**Figure 43. SWM Pond 52 - Cultural Meadow**





**Figure 44. SWM Pond 52 - Deciduous Forest**



**Figure 45. SWM Pond 55 - Cultural Meadow**





**Figure 46. SWM Pond 55 - Deciduous Forest**



**Figure 47. SWM Pond 56 - Cultural Meadow**



**Figure 48. SWM Pond 56 - Shallow Marsh**



**Figure 49. SWM Pond 56 – Thicket**





**Figure 50. SWM Pond 70 - Cultural Meadow**



**Figure 51. SWM Pond 70 - Shallow Marsh**



**Figure 52. SWM Pond 74 - Cultural Meadow**



**Figure 53. SWM Pond 74 - Mixed Forest**





**Figure 54. Uncontrolled SWM Area 163 - Mixed Forest**



**Figure 55. Uncontrolled SWM Area 103 - Cultural Meadow**





**Figure 56. Uncontrolled SWM Area 103 - Deciduous Forest**



**Figure 57. Uncontrolled SWM Area 134 - Deciduous Forest**





**Figure 58. Uncontrolled SWM Area 134 - Mixed Forest**



**Figure 59. Uncontrolled SWM Area 134 - American Mink**





**Figure 60. Uncontrolled SWM Area 106 - Deciduous Forest**



**Figure 61. Uncontrolled SWM Area 106 - Coniferous Forest**





**Figure 62. Uncontrolled SWM Area 106 – Butternut #1 with Butternut Canker**



**Figure 63. Uncontrolled SWM Area 106 - Butternut #2**



**Figure 64. Uncontrolled SWM Area 176 - Cultural Meadow**



**Figure 65. Uncontrolled SWM Area 112 - Cultural Meadow**



**Figure 66. Uncontrolled SWM Area 159 - Shallow Marsh**



**Figure 67. Uncontrolled SWM Area 55 - Cultural Meadow**





**Figure 68. Uncontrolled SWM Area 162 - Cultural Meadow**



**Figure 69. Uncontrolled SWM Area 105 - Shallow Marsh in Front & Deciduous Forest Behind**





**Figure 70. Uncontrolled SWM Area 67 - Mixed Forest**



**Figure 71. Uncontrolled SWM Area 8 - Deciduous Forest**

## **APPENDIX C**

### **Uncontrolled Outlet Field Investigations**



## Outlet #8



To see all the details that are visible on the screen, use the Print link next to the map.

*Worsley Court*





#8

steep slope blocking  
access from North

WWKSOWN\_STORM\_SEWER  
WWKSOWN\_CATCH\_BASIN



Under construction. Building bridge to widen Hwy 7.



## Field Inspection Form – Uncontrolled Areas

Uncontrolled Outlet ID # 8  
General location / Major Intersection Rodick Rd & Hwy 7.  
Date Nov. 21, 2012  
Inspection Completed By Melody Giles & Patricia Osika

### LAND CONDITIONS

#### Existing Land Use:

Residential ☐ Commercial ☐ Industrial ☐ Parkland/Open Space ☒

Mix = (describe) \_\_\_\_\_

woodlot behind house

Amount of space available to construct a stormwater management facility: \_\_\_\_\_

Factors that may limit the amount of space available: widening of Hwy 7 &  
Hwy 7 bridge adjacent to site.

Notes about the grading of the site (draw a sketch of site and label direction of slope

and slope steepness): relatively flat area w/ steep slopes on  
west side leading up to houses & streets

Visible utilities that conflict with proposed pond location: \_\_\_\_\_

overhead hydro lines along Hwy 7.  
wideared

Other visible physical conflicts and natural hazards that conflict with proposed pond location: \_\_\_\_\_

Access path available for construction equipment (describe and shown on sketch):

only access would be from Hwy 7 - slope down from th  
7 is somewhat steep (still under construction).

Access obstacles, if any: \_\_\_\_\_

To access from \_\_\_\_\_ would have to cross  
channel b/c bounded on W. by ~~steep~~ very steep slopes

Other notes: \_\_\_\_\_

### STORM SEWER OUTLET

Description of outlet structures and shapes: wing wall w/ concrete blocks

Description of outlet materials: cement

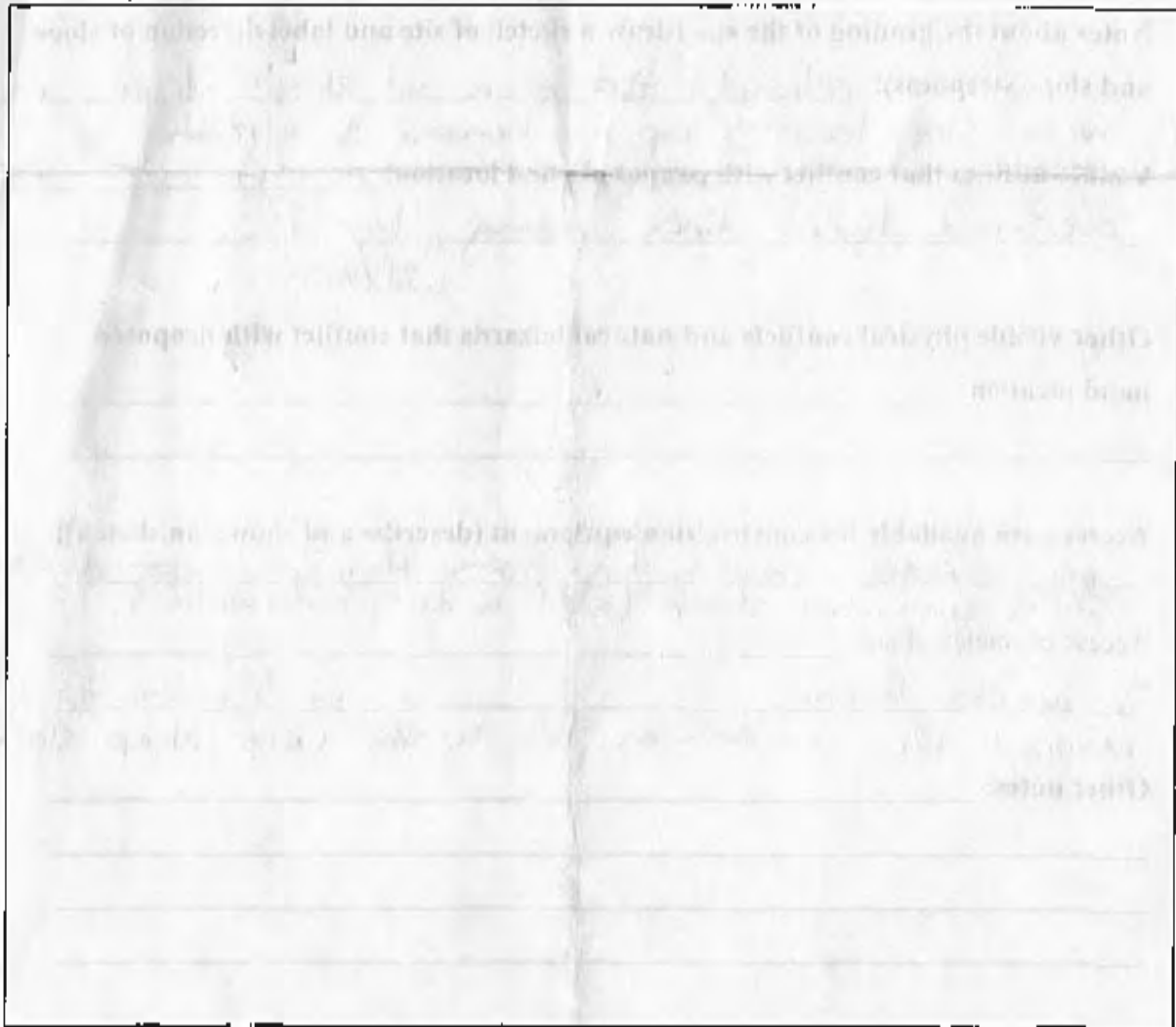
Size of outlet pipe: 80 cm  $\phi$  (grate 110 cm wide)

Size / dimensions of other outlet structures: \_\_\_\_\_

Other descriptions: gobbling basket at <sup>base of</sup> outlet have failed  
It got washed away & there is significant erosion / undercutting

### SKETCH OF SUBJECT AREA

Label site grading (including slope steepness), potential construction equipment access paths, observed utilities, observed natural hazards and other physical obstacles, outlet location, north arrow.



#55

— WWSOWN\_STORM\_SEWER  
■ WWSOWN\_CATCH\_BASIN

↑ 2





## Field Inspection Form – Uncontrolled Areas

Uncontrolled Outlet ID # 55

General location : Major Intersection \_\_\_\_\_

Date Nov. 22, 2012

Inspection Completed By Melody Giles

### LAND CONDITIONS

Existing Land Use:

Residential ☐

Commercial ☐

Industrial ☐

Parkland/Open Space ☒

Mix ☐ (describe) \_\_\_\_\_

Amount of space available to construct a stormwater management facility: \_\_\_\_\_

Factors that may limit the amount of space available: path through park,  
steep slope leading to houses.

Notes about the grading of the site (draw a sketch of site and label direction of slope and slope steepness): small area that is flat.

Visible utilities that conflict with proposed pond location: none.

Other visible physical conflicts and natural hazards that conflict with proposed pond location: \_\_\_\_\_

Access path available for construction equipment (describe and shown on sketch):

Access from Henderson Ave, follow gravel park  
path to site.

Access obstacles, if any: Forest Park Cross @ the intersection of

Other notes: \_\_\_\_\_

Heritage Conservation Neighborhood.

### STORM SEWER OUTLET

Description of outlet structures and shapes: CSP sticking out of side of

Description of outlet materials: CSP / watercourse bank surrounds  
at same or near stone & top

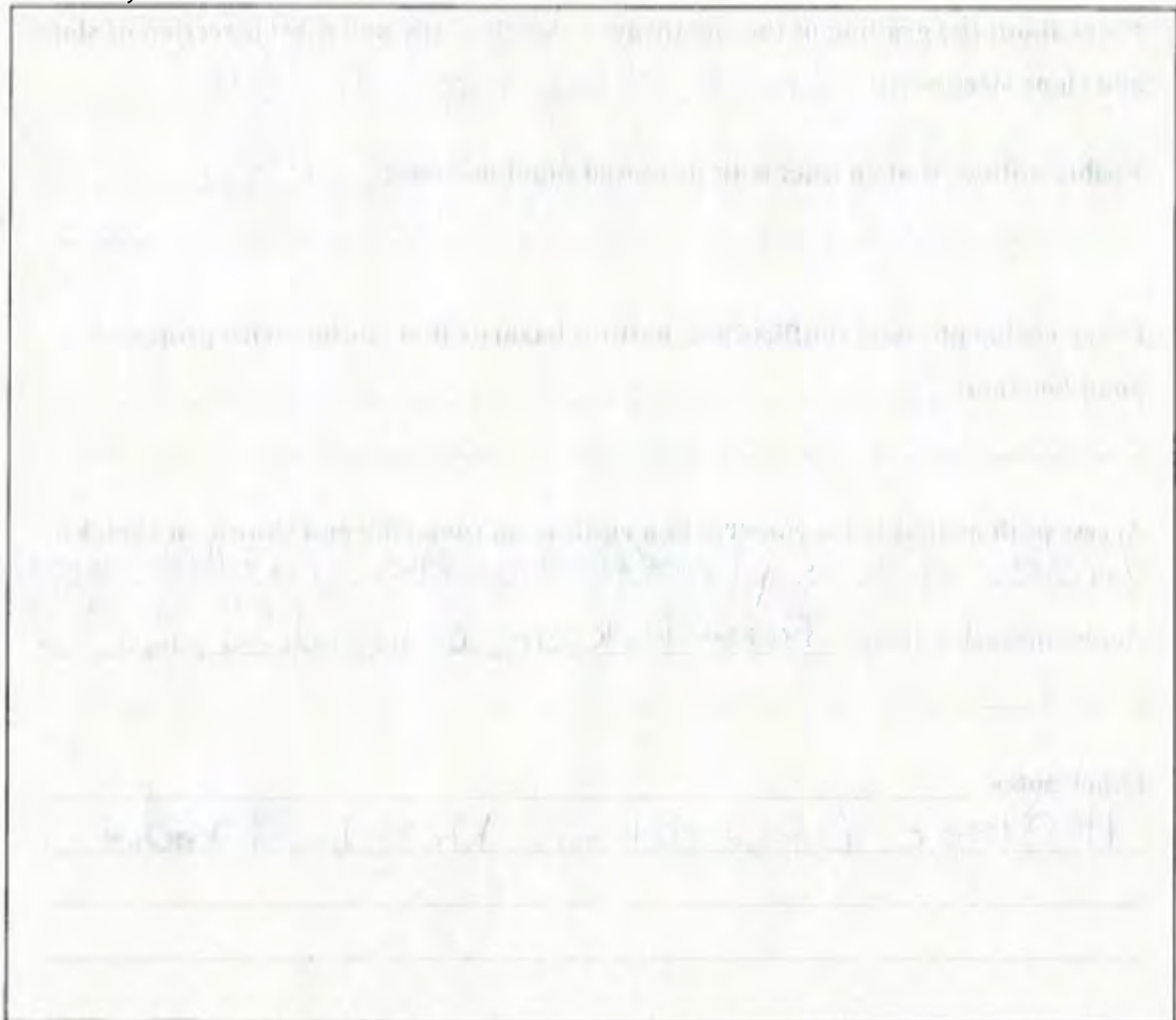
Size of outlet pipe: 75 cm  $\phi$

Size / dimensions of other outlet structures: \_\_\_\_\_

Other descriptions: \_\_\_\_\_

### SKETCH OF SUBJECT AREA

Label site grading (including slope steepness), potential construction equipment access paths, observed utilities, observed natural hazards and other physical obstacles, outlet location, north arrow.





# 63w

- WWKSOWN\_STORM\_SEWER
- WWKSOWN\_CATCH\_BASIN

↑ 2





## Field Inspection Form – Uncontrolled Areas

Uncontrolled Outlet ID # 630

General location / Major Intersection \_\_\_\_\_

Date Nov 22, 2012

Inspection Completed By Melody Giles

### LAND CONDITIONS

Existing Land Use: \_\_\_\_\_

Residential ☐

Commercial ☐

Industrial ☐

Parkland/Open Space ☒

Mix ☐ (describe) \_\_\_\_\_

Amount of space available to construct a stormwater management facility: \_\_\_\_\_

Factors that may limit the amount of space available: \_\_\_\_\_

city park land?

Notes about the grading of the site (draw a sketch of site and label direction of slope and slope steepness): relatively even

Visible utilities that conflict with proposed pond location: no

overhead cables along Procter Rd.

Other visible physical conflicts and natural hazards that conflict with proposed pond location: \_\_\_\_\_

Access path available for construction equipment (describe and shown on sketch):

from Procter Rd. Very good access

Access obstacles, if any: \_\_\_\_\_

Other notes: \_\_\_\_\_

### STORM SEWER OUTLET

Description of outlet structures and shapes: 2 rectangular box culverts / outlets

Description of outlet materials: cement w/ metal swinging gate

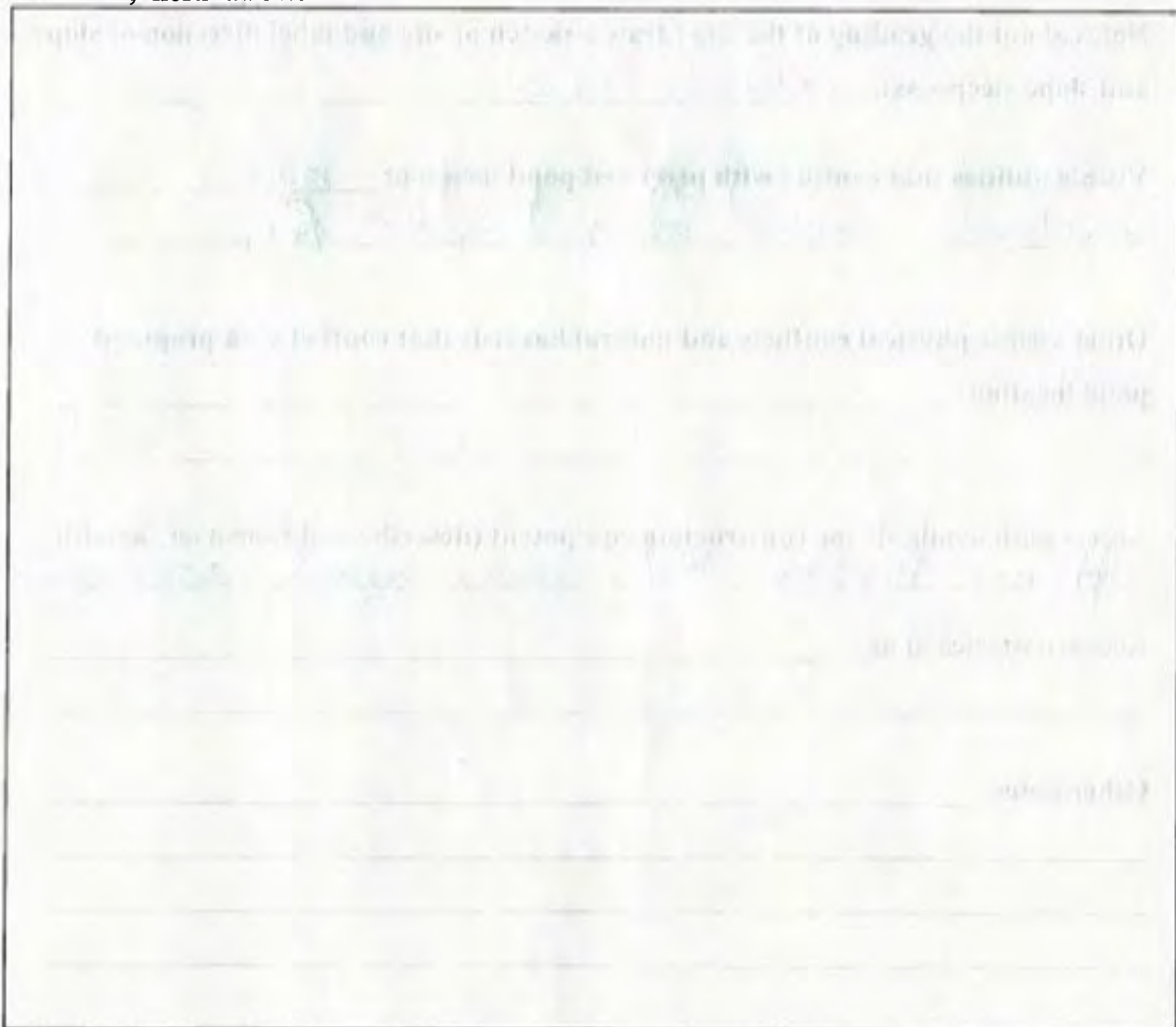
Size of outlet pipe: 2m wide x 2

Size / dimensions of other outlet structures: \_\_\_\_\_

Other descriptions: \_\_\_\_\_

### SKETCH OF SUBJECT AREA

Label site grading (including slope steepness), potential construction equipment access paths, observed utilities, observed natural hazards and other physical obstacles, outlet location, north arrow.

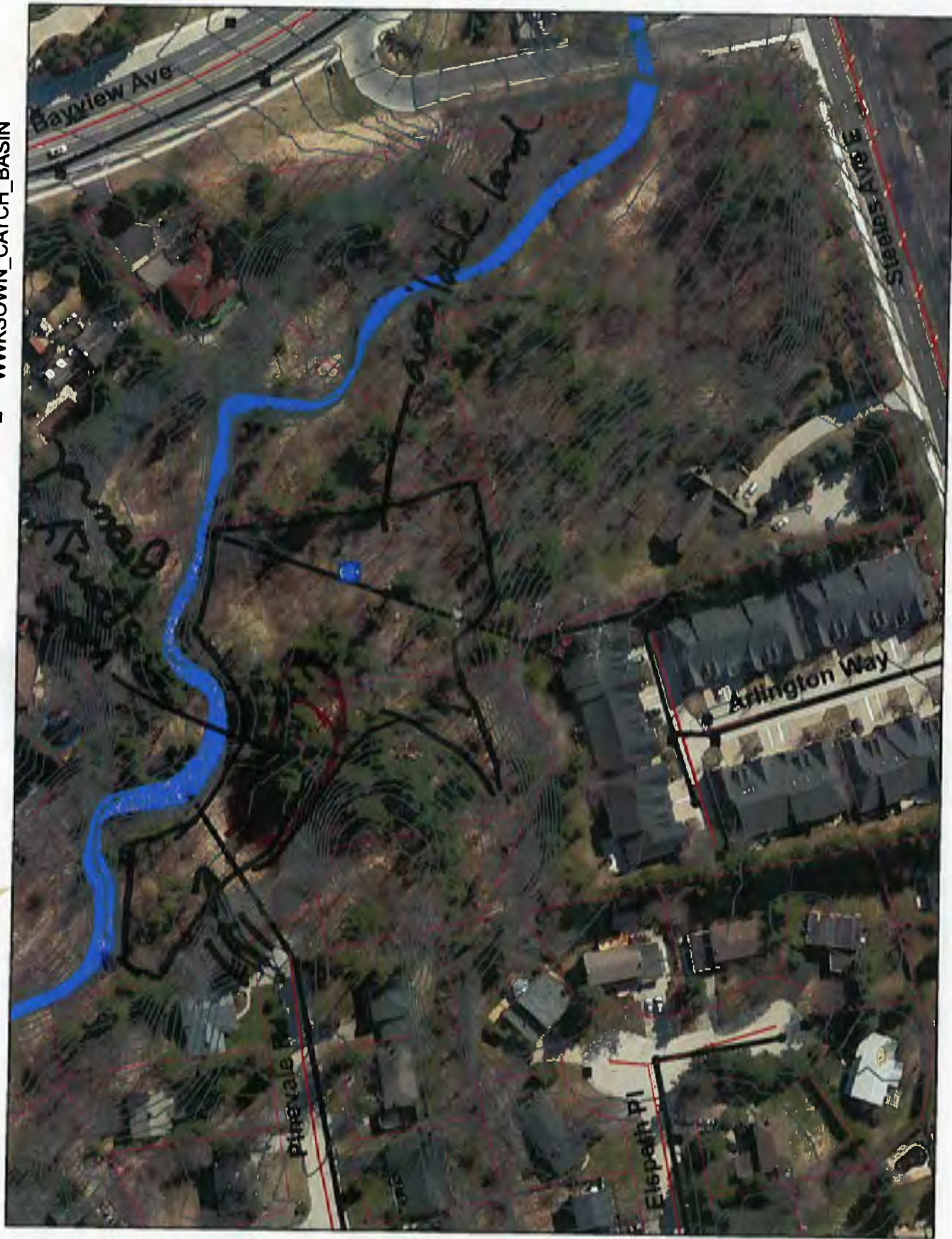




#67

— WWKSOWN\_STORM\_SEWER  
■ WWKSOWN\_CATCH\_BASIN

↑ 2





## Field Inspection Form – Uncontrolled Areas

Uncontrolled Outlet ID # 67

General location: Major Intersection \_\_\_\_\_

Date Nov. 22, 2012

Inspection Completed By \_\_\_\_\_

Melody Gier

### LAND CONDITIONS

Existing Land Use:

Residential ☐

Commercial ☐

Industrial ☐

Parkland/Open Space ☒

Mix ☐ (describe) \_\_\_\_\_

Amount of space available to construct a stormwater management facility: \_\_\_\_\_

Factors that may limit the amount of space available: \_\_\_\_\_

Notes about the grading of the site (draw a sketch of site and label direction of slope and slope steepness): \_\_\_\_\_

Visible utilities that conflict with proposed pond location: \_\_\_\_\_

Other visible physical conflicts and natural hazards that conflict with proposed pond location: \_\_\_\_\_

Access path available for construction equipment (describe and shown on sketch):

Only available access if from Pinevale Rd & would have to build up access to reduce steepness.

Access obstacles, if any: \_\_\_\_\_

From Pinevale to 2nd outlet (Arlington Way) would have to traverse very wet/spongy ground.

Other notes: \_\_\_\_\_

## STORM SEWER OUTLET

Description of outlet structures and shapes:

Description of outlet materials:

Size of outlet pipe:

Size / dimensions of other outlet structures:

Other descriptions:

Artington Way outlet is cement wing wall w/ 45cm  $\phi$  circular opening w/ metal grate & no chute blocks.

### SKETCH OF SUBJECT AREA

Label site grading (including slope steepness), potential construction equipment access paths, observed utilities, observed natural hazards and other physical obstacles, outlet location, north arrow.





# 94

→ site access

—●— overhead hydro

— WWKSOWN\_STORM\_SEWER

■ WWKSOWN\_CATCH\_BASIN

↑ 2





## Field Inspection Form – Uncontrolled Areas

Uncontrolled Outlet ID # 94  
General location : Major Intersection Village Pkwy & Hwy 7  
Date Nov. 21, 2012  
Inspection Completed By Melody Giles

### LAND CONDITIONS

#### Existing Land Use:

Residential ☐ Commercial ☐ Industrial ☐ Parkland/Open Space ☒  
Mix ☐ (describe) \_\_\_\_\_

Amount of space available to construct a stormwater management facility: \_\_\_\_\_

Factors that may limit the amount of space available: recreation facilities  
in park (double tennis court & childrens playgrounds).

Notes about the grading of the site (draw a sketch of site and label direction of slope and slope steepness): area is relatively flat everywhere

Visible utilities that conflict with proposed pond location: buried electrical  
for tennis court lights.  
Overhead hydro crosses water course DS of outlet.

Other visible physical conflicts and natural hazards that conflict with proposed pond location: \_\_\_\_\_

Access path available for construction equipment (describe and shown on sketch):

Access A of Sciberras Rd (wide opening)  
and potentially from Fred Varty Dr (paved pedestrian path thru houses)

Access obstacles, if any: \_\_\_\_\_

Other notes: Park area used by children (has playgrounds).

## STORM SEWER OUTLET

Description of outlet structures and shapes: wing wall w/ circular opening & grate  
(no chute block)

Description of outlet materials: cement w/ metal grate

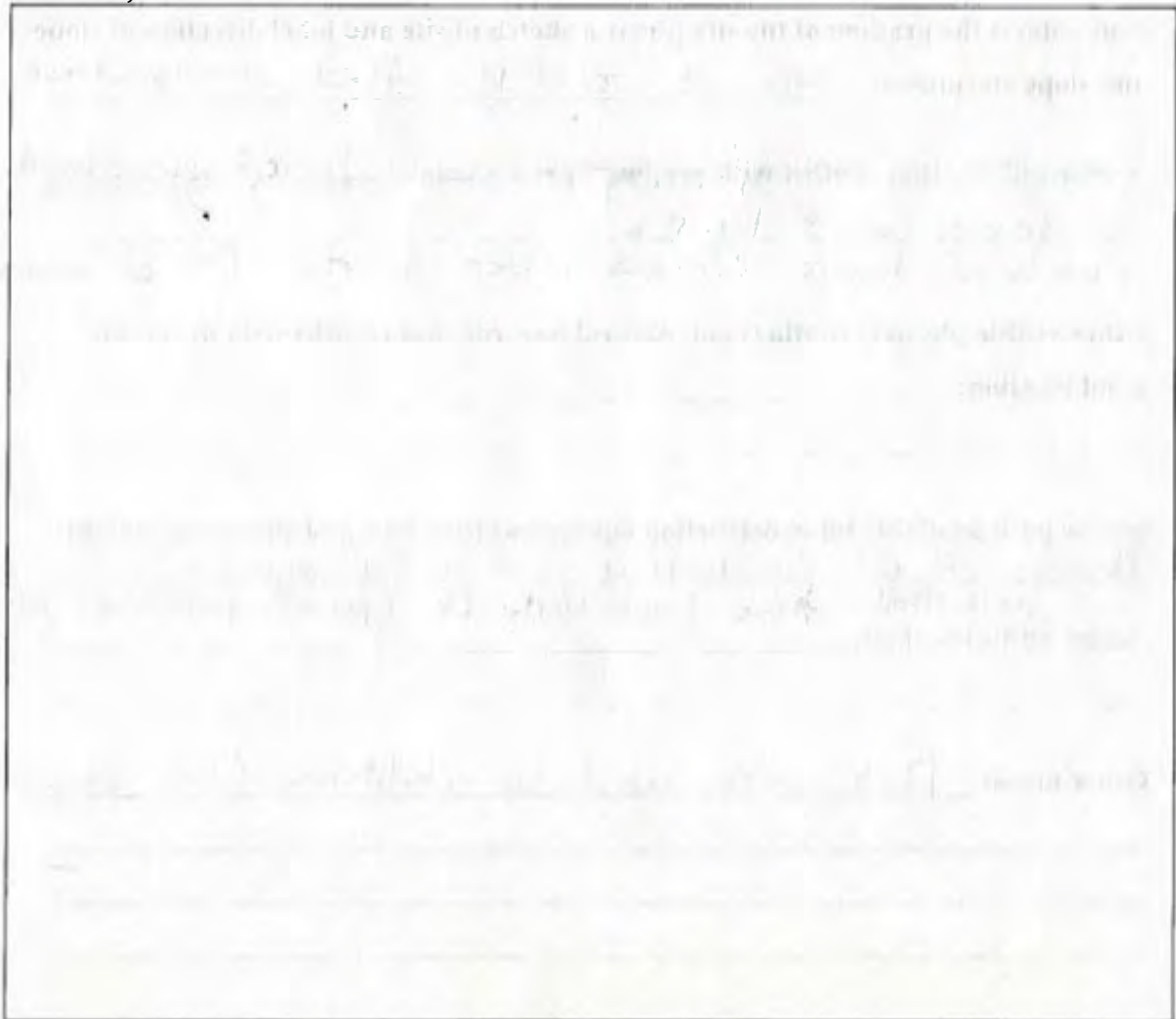
Size of outlet pipe: 90 cm  $\phi$  (grade 105cm wide)

Size / dimensions of other outlet structures: U/S channel culvert/outlet  
diameter  $\approx$  180cm CSP w/ armystone surrounding it

Other descriptions: \_\_\_\_\_  
\_\_\_\_\_

## SKETCH OF SUBJECT AREA

Label site grading (including slope steepness), potential construction equipment access paths, observed utilities, observed natural hazards and other physical obstacles, outlet location, north arrow.





#103

— WWSOWN\_STORM\_SEWER  
■ WWSOWN\_CATCH\_BASIN

↑ 2





## Field Inspection Form – Uncontrolled Areas

Uncontrolled Outlet ID # 103

General location / Major Intersection \_\_\_\_\_

Date Nov. 15

Inspection Completed By Melody Giles

### LAND CONDITIONS

Existing Land Use:

Residential ☐

Commercial ☐

Industrial ☐

Parkland/Open Space ☒

Mix ☐ (describe) \_\_\_\_\_

Amount of space available to construct a stormwater management facility: \_\_\_\_\_

Factors that may limit the amount of space available: nearby municipal public buildings (Library & community centre). Public trails through wooded area.

Notes about the grading of the site (draw a sketch of site and label direction of slope and slope steepness): Slope gradual valley area <sup>from roads</sup> behind buildings - steeper slope

Visible utilities that conflict with proposed pond location: None overhead.

Fire hydrant. Possibly SAN sewer line. Light posts in park that would have buried cables.

Other visible physical conflicts and natural hazards that conflict with proposed pond location: none

Access path available for construction equipment (describe and shown on sketch):

off of Main St. Unionville.

Access obstacles, if any: \_\_\_\_\_

Other notes: slope behind buildings could be pulled back closer to community centre to make space.

• Could build a pond connected to existing pond & install another pedestrian bridge to maintain pathway.

## STORM SEWER OUTLET

Description of outlet structures and shapes: rectangular outlet in wing wall of large chute blocks

Description of outlet materials: cement.

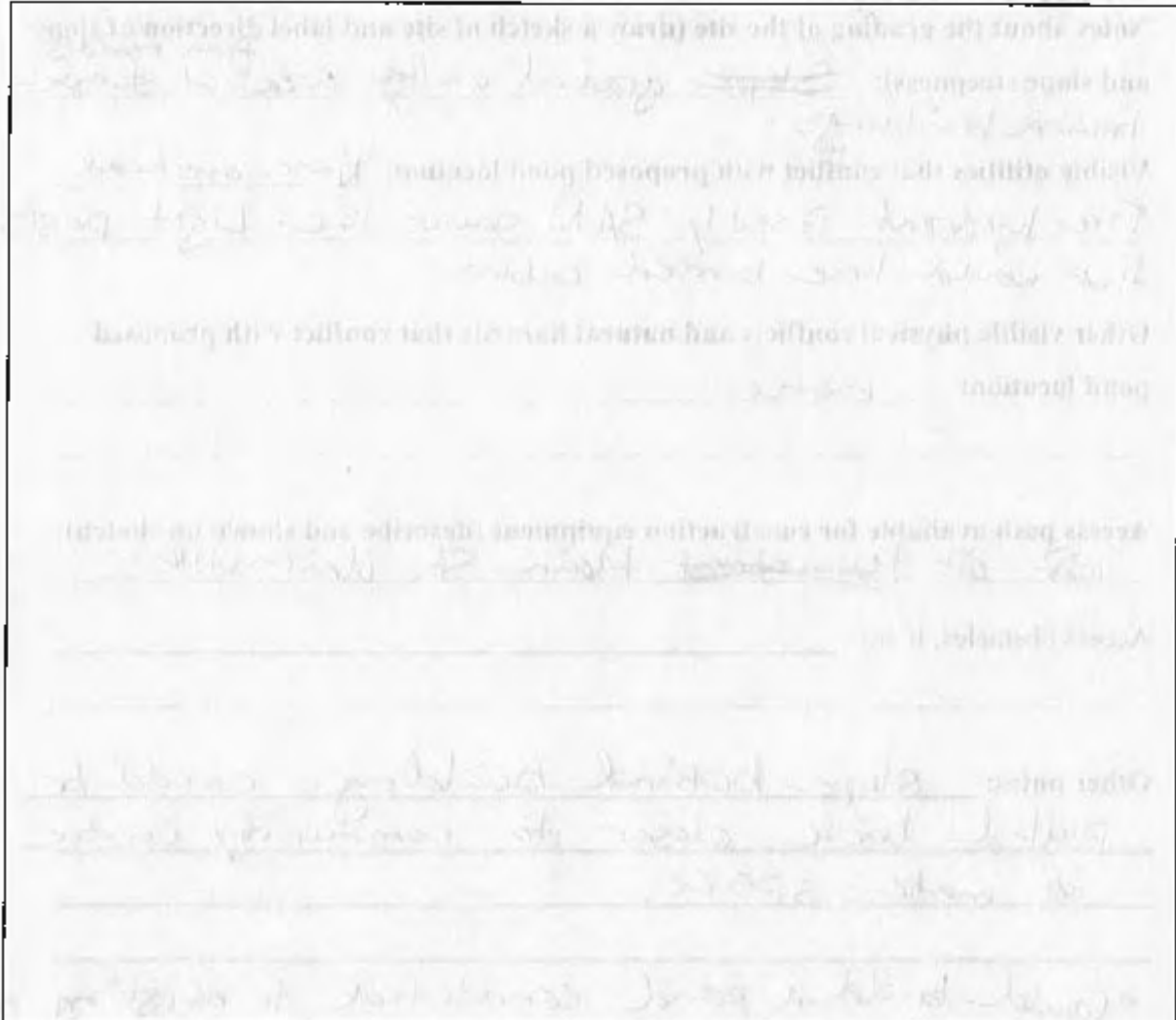
Size of outlet pipe: 80 cm tall x 2m wide.

Size / dimensions of other outlet structures: adjacent cement pipe (dry) 30cm diameter.

Other descriptions: \_\_\_\_\_

## SKETCH OF SUBJECT AREA

Label site grading (including slope steepness), potential construction equipment access paths, observed utilities, observed natural hazards and other physical obstacles, outlet location, north arrow.



#105 & 106

— WWKSOWN\_STORM\_SEWER  
■ WWKSOWN\_CATCH\_BASIN

↑ 2





#100

x photo locations

— WWKSOWN\_STORM\_SEWER  
■ WWKSOWN\_CATCH\_BASIN



↑  
2

## Field Inspection Form – Uncontrolled Areas

Uncontrolled Outlet ID # 105  
General location / Major Intersection \_\_\_\_\_  
Date Nov. 15, 2012  
Inspection Completed By Melody Giles

### LAND CONDITIONS

#### Existing Land Use:

Residential ☐ Commercial ☐ Industrial ☐ Parkland/Open Space ☒  
Mix ☐ (describe) \_\_\_\_\_

Amount of space available to construct a stormwater management facility: \_\_\_\_\_

Factors that may limit the amount of space available: multiple paths.  
A number of trees & marsh habitat.

Notes about the grading of the site (draw a sketch of site and label direction of slope and slope steepness): Overall area is low lying & wet wet pockets

Visible utilities that conflict with proposed pond location: none

Other visible physical conflicts and natural hazards that conflict with proposed pond location: ~~none~~ none.

Access path available for construction equipment (describe and shown on sketch):

Along paved park path off of Normandale Rd

Access obstacles, if any: wet ground

Other notes: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## STORM SEWER OUTLET

Description of outlet structures and shapes: circular outlet in wing wall in chase  
blocks

Description of outlet materials: cement

Size of outlet pipe: ~ 90 cm Ø

Size / dimensions of other outlet structures: none

Other descriptions:

## SKETCH OF SUBJECT AREA

Label site grading (including slope steepness), potential construction equipment access paths, observed utilities, observed natural hazards and other physical obstacles, outlet location, north arrow.

see aerial photo



#105 & 106

— WWKSOWN\_STORM\_SEWER  
■ WWKSOWN\_CATCH\_BASIN





#106

WWKSOWN\_STORM\_SEWER  
■ WWKSOWN\_CATCH\_BASIN



## Field Inspection Form – Uncontrolled Areas

Uncontrolled Outlet ID # 106

General location / Major Intersection \_\_\_\_\_

Date Nov. 15

Inspection Completed By Melody Giles

### LAND CONDITIONS

Existing Land Use:

Residential ☐

Commercial ☐

Industrial ☐

Parkland/Open Space ☒

Mix ☐ (describe) \_\_\_\_\_

Amount of space available to construct a stormwater management facility: \_\_\_\_\_

Factors that may limit the amount of space available: small area btwn back of houses & creek. Has multiple paved park paths further reducing area.

Notes about the grading of the site (draw a sketch of site and label direction of slope

and slope steepness): uneven subject area but not ~~too~~ big change in elevation  
Moderate slope down to subject area from street.

Visible utilities that conflict with proposed pond location: \_\_\_\_\_

none

Other visible physical conflicts and natural hazards that conflict with proposed

pond location: Floodplain. Winding channel & winding park path.

Access path available for construction equipment (describe and shown on sketch):

along paved park path or directly down the slope  
front Goodhills Cr.

Access obstacles, if any: \_\_\_\_\_

Other notes: Not much space. A pond would likely not fit.  
Number of older / larger trees present.



## STORM SEWER OUTLET

Description of outlet structures and shapes: circular outlet in wing wall w/ check blocks

Description of outlet materials: cement.

Size of outlet pipe: ~ 110 cm Ø

Size / dimensions of other outlet structures: \_\_\_\_\_

wing wall has ~ 160 cm long back face (side of outlet)

Other descriptions: \_\_\_\_\_

## SKETCH OF SUBJECT AREA

Label site grading (including slope steepness), potential construction equipment access paths, observed utilities, observed natural hazards and other physical obstacles, outlet location, north arrow.

see aerial photo

#112

South Fork  
of  
Savannah River

WWKSOWN\_STORM\_SEWER  
WWKSOWN\_CATCH\_BASIN

↑ N

at the  
Photo  
of 360  
Savannah  
River



could realign portion of path



## Field Inspection Form – Uncontrolled Areas

Uncontrolled Outlet ID # 112

General Location / Major Intersection

Date Nov 15, 2012

Inspection Completed By

16<sup>th</sup> Ave & Valley Village Pkwy  
Melody Giles

### LAND CONDITIONS

Existing Land Use:

Residential ☐

Commercial ☐

Industrial ☐

Parkland/Open Space ☒

Mix ☐ (describe) \_\_\_\_\_

Amount of space available to construct a stormwater management facility: \_\_\_\_\_

Factors that may limit the amount of space available:

narrow space btwn creek & backs of houses. Paved park path runs along back of houses.

Notes about the grading of the site (draw a sketch of site and label direction of slope

and slope steepness):

prop. pond areas generally flat. Steep slopes down to subject area from nearby roads.

Visible utilities that conflict with proposed pond location:

No overhead utilities in pond area but hydro lines run along 16<sup>th</sup> Ave which would be an access consideration.

Other visible physical conflicts and natural hazards that conflict with proposed

pond location:

paved path could be realigned to make more space.

Access path available for construction equipment (describe and shown on sketch):

Access from 16<sup>th</sup> Ave - slope is steep

Access obstacles, if any:

Other option is along paved park path @ SE corner of Village Pkwy & Rae Cres. somewhat steep slope leading down from 16<sup>th</sup>. Overhead hydro along 16<sup>th</sup> Ave.

Other notes:

but then cut some trees for access along more shallow slope & cross park path again to access subject area.



## STORM SEWER OUTLET

Description of outlet structures and shapes: circular outlet in <sup>the</sup> side of a box culvert.

Description of outlet materials: cement box culvert w/ outlet opening

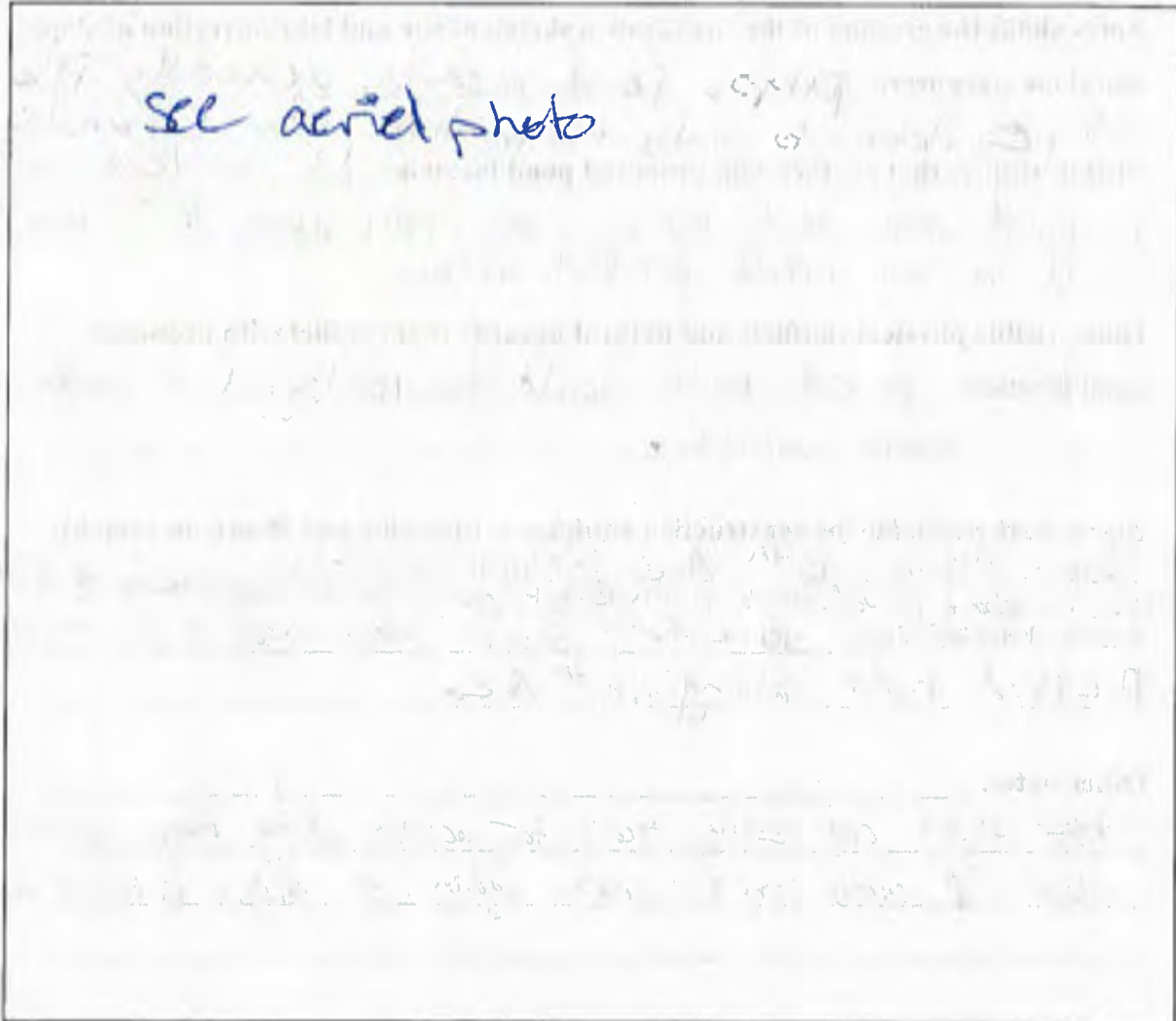
Size of outlet pipe: ~ 60 cm Ø

Size / dimensions of other outlet structures: none

Other descriptions: MH located near bridge/culvert, in the side slope

## SKETCH OF SUBJECT AREA

Label site grading (including slope steepness), potential construction equipment access paths, observed utilities, observed natural hazards and other physical obstacles, outlet location, north arrow.



- WWKSOWN\_STORM\_MANHOLE
- WWKSOWN\_STORM\_SEWER
- WWKSOWN\_CATCH\_BASIN
- Uncontrolled\_Proposed\_1999



#134



## Field Inspection Form - Uncontrolled Areas

Uncontrolled Outlet ID # 134

General location / Major Intersection @ end of Brookbanks Crt. - near 16<sup>th</sup>

Date Nov 14, 2012

a McCowan

Inspection Completed By Melody Giles

### LAND CONDITIONS

#### Existing Land Use:

Residential ☐ Commercial ☐ Industrial ☐ Parkland/Open Space ☒

Mix ☐ (describe) \_\_\_\_\_

Amount of space available to construct a stormwater management facility: \_\_\_\_\_

Factors that may limit the amount of space available: secondary channels  
in places adjacent to main channel.

Notes about the grading of the site (draw a sketch of site and label direction of slope and slope steepness): relatively flat area. Gradual slope down to area from roads.

Visible utilities that conflict with proposed pond location: no visible overhead utilities & no signs for buried utilities observed.

Other visible physical conflicts and natural hazards that conflict with proposed pond location: none. Floodplain.

Access path available for construction equipment (describe and shown on sketch):

Access to outlet from Brookbanks Crt. to ~~the~~ Sloped down to creek rather gradually.

Access obstacles, if any: \_\_\_\_\_

Other notes: \_\_\_\_\_



## STORM SEWER OUTLET

Description of outlet structures and shapes: Circular outlet in wing wall <sup>skandalone</sup> <sup>w/ gate</sup>

Description of outlet materials: Cement wing wall & pipe outlet. Chain

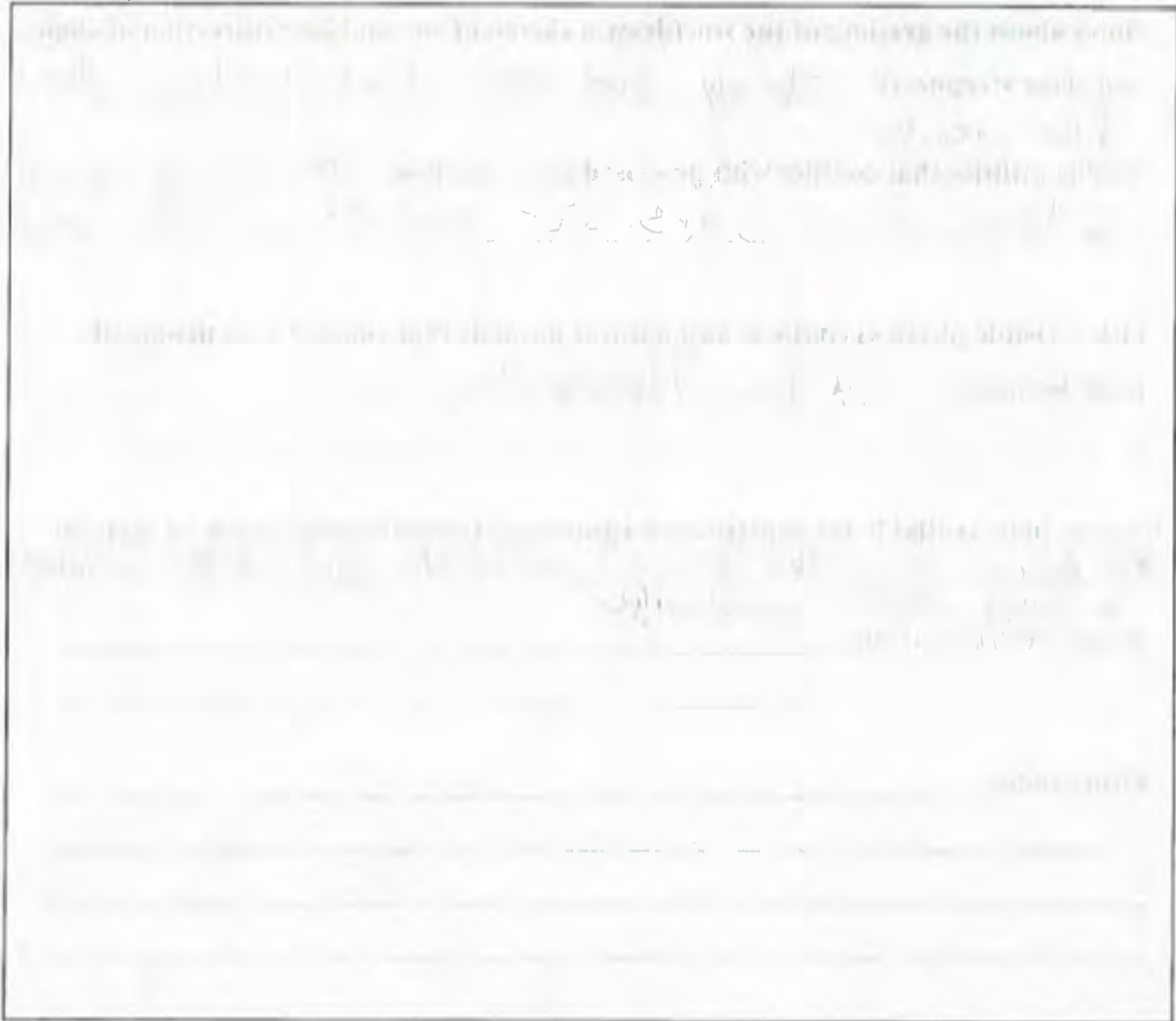
Size of outlet pipe: ~1.05m  $\phi$  <sup>link fence on top of wing wall.</sup>

Size / dimensions of other outlet structures: none

Another outlet is located under Raymerville Dr bridge. Bridge is ~130cm high so outlet ~1m  $\phi$  or less. Cement culvert w/ outlet on its side. Staff gauge & possibly water quality monitoring occurring at bridge. <sup>Automated</sup> <sup>the</sup> <sup>a metal gate over it.</sup>

## SKETCH OF SUBJECT AREA

Label site grading (including slope steepness), potential construction equipment access paths, observed utilities, observed natural hazards and other physical obstacles, outlet location, north arrow.



- WWKSOWN\_STORM\_MANHOLE
- WWKSOWN\_STORM\_SEWER
- WWKSOWN\_CATCH\_BASIN
- Uncontrolled\_Proposed\_1999

↑  
N

Slightly higher  
elev. area  
gravel  
trap  
open  
SPM



#159



## Field Inspection Form – Uncontrolled Areas

Uncontrolled Outlet ID #: 159

General location: Major Intersection McLennan & Hwy 7, Outlet at McLennan bridge

Date Nov. 14, 2012

Inspection Completed By: Melody Giles

### LAND CONDITIONS

Existing Land Use:

Residential ☐ Commercial ☐ Industrial ☐ Parkland/Open Space ☒

Mix = (describe) \_\_\_\_\_

Milline  
Dam  
Conserva  
Area  
Park

Amount of space available to construct a stormwater management facility: \_\_\_\_\_

Factors that may limit the amount of space available: open space is  
conservation lands.

Notes about the grading of the site (draw a sketch of site and label direction of slope

and slope steepness): Generally flat, reedy & tall grasses of river floodpl  
Outlet may be lower than floodplain lands bc outlet partially  
submerged in river.

Visible utilities that conflict with proposed pond location: No overhead utilities  
in subject area. Buried cables along McLennan for street lights  
Buried natural gas pipeline ~ 10m from outlet.

Other visible physical conflicts and natural hazards that conflict with proposed

pond location: Access to floodplain area is easy off at  
Conservation Area driveway/road.

Access path available for construction equipment (describe and shown on sketch): \_\_\_\_\_

Access obstacles, if any: soft ground

Other notes: \_\_\_\_\_



## STORM SEWER OUTLET

Description of outlet structures and shapes: circular cement outlet in headwall

Description of outlet materials: cement headwall w/ opening & metal grate

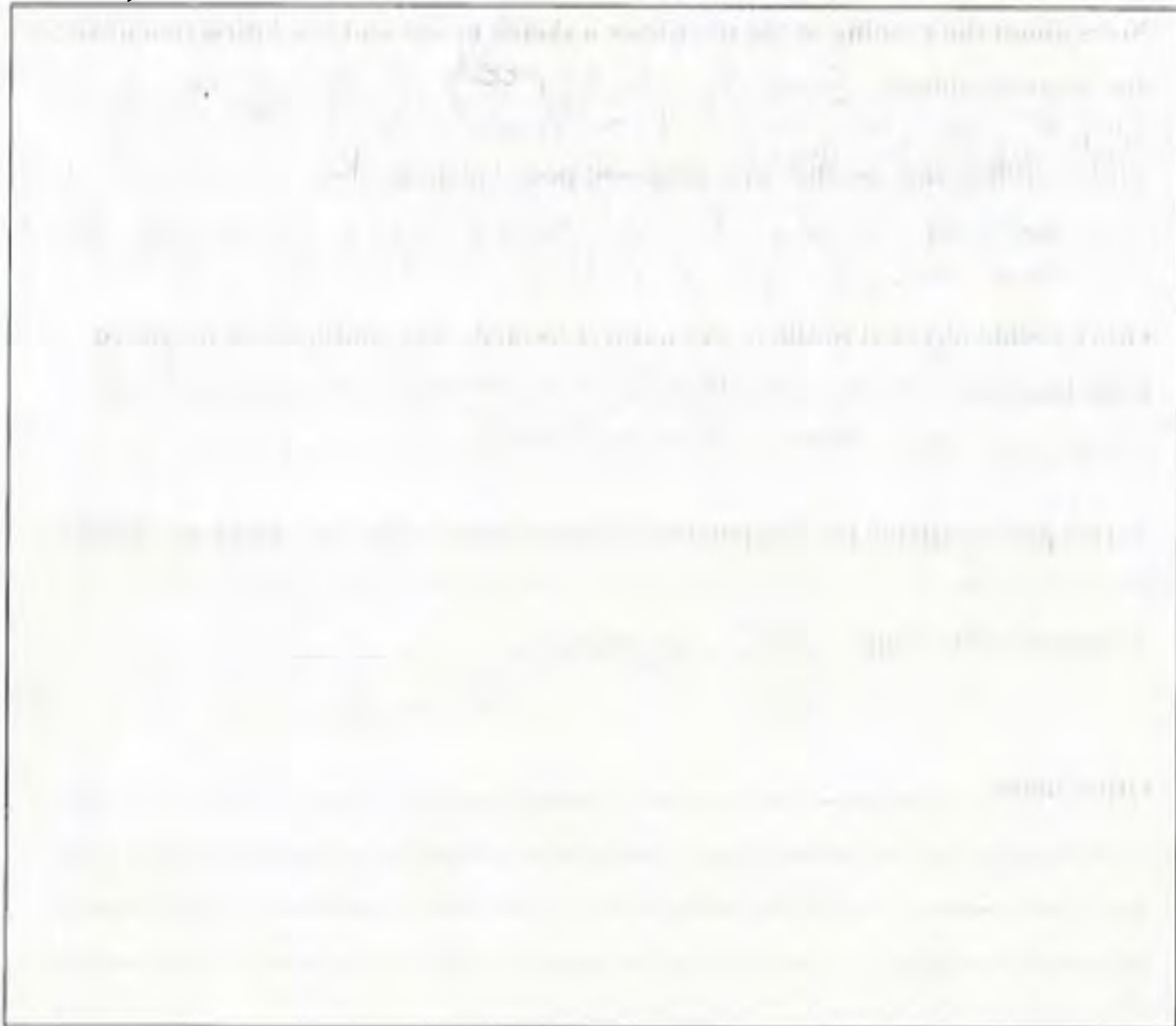
Size of outlet pipe: ~98 cm Ø

Size / dimensions of other outlet structures: Similar outlet on S. bank, directly opposite of this outlet. (half the size of subject outlet).

Other descriptions: Outlet on N. bank of river adjacent to McLaren Rd bridge.

## SKETCH OF SUBJECT AREA

Label site grading (including slope steepness), potential construction equipment access paths, observed utilities, observed natural hazards and other physical obstacles, outlet location, north arrow.



← 2

#162





## Field Inspection Form - Uncontrolled Areas

Uncontrolled Outlet ID # 162

General location: Major Intersection \_\_\_\_\_

Date Nov. 22, 2012

Inspection Completed By Melody Giles

### LAND CONDITIONS

Existing Land Use:

Residential ☐

Commercial ☐

Industrial ☐

Parkland ☐ Open Space ☒

Mix ☐ (describe) \_\_\_\_\_

Amount of space available to construct a stormwater management facility: \_\_\_\_\_

Factors that may limit the amount of space available: \_\_\_\_\_

large flat area  
bounded by steep slopes (w/ Rd or houses at top)  
and by watercourse.

Notes about the grading of the site (draw a sketch of site and label direction of slope

and slope steepness): large flat area. Medium steep slope from  
James Walker Cr. to outlet.

Visible utilities that conflict with proposed pond location: none

Other visible physical conflicts and natural hazards that conflict with proposed pond location: \_\_\_\_\_

Access path available for construction equipment (describe and shown on sketch):

Along Mill St (off of Main St Markham S)  
or vegetated strip of land off of James Walker Cr.

Access obstacles, if any: \_\_\_\_\_

Buffer of large trees on slope from Rd to outlet/flat area  
Overhead cables across Mill St.

Other notes: \_\_\_\_\_



## STORM SEWER OUTLET

Description of outlet structures and shapes: Flat headwall w/ circular hole.

Description of outlet materials: Cement w/ metal grate & rip rap flow path

Size of outlet pipe: 47 in  $\phi$  inner.

Size / dimensions of other outlet structures: 2x15 m wide headwall

Other descriptions: \_\_\_\_\_

## SKETCH OF SUBJECT AREA

Label site grading (including slope steepness), potential construction equipment access paths, observed utilities, observed natural hazards and other physical obstacles, outlet location, north arrow.

see aerial photo

← 2

access off of Tudor Lane.



#163



## Field Inspection Form – Uncontrolled Areas

Uncontrolled Outlet ID # 163

General location / Major Intersection \_\_\_\_\_

Date Nov. 22, 2012

Inspection Completed By Melody Giles

### LAND CONDITIONS

Existing Land Use:

Residential ☐

Commercial ☐

Industrial ☐

Parkland/Open Space ☒

Mix ☐ (describe) \_\_\_\_\_

Rouge Valley Park

Amount of space available to construct a stormwater management facility: \_\_\_\_\_

Factors that may limit the amount of space available: Rouge Valley Park.

Outlet at base of cliff. Connecting Mt at top of cliff.

Notes about the grading of the site (draw a sketch of site and label direction of slope and slope steepness): \_\_\_\_\_

Visible utilities that conflict with proposed pond location: \_\_\_\_\_

none

Other visible physical conflicts and natural hazards that conflict with proposed pond location: extremely steep & tall cliff blun easiest access

(Colonel Butler Dr) & outlet. Outlet is in a deep valley.

No clear access path from Tuelor Lane either, and in this case we

Access path available for construction equipment (describe and shown on sketch):

have to travel a long distance through forest

Access obstacles, if any: \_\_\_\_\_

Other notes: \_\_\_\_\_



### STORM SEWER OUTLET

Description of outlet structures and shapes: large wing wall w/ chute blocks

Description of outlet materials: cement

Size of outlet pipe: unknown

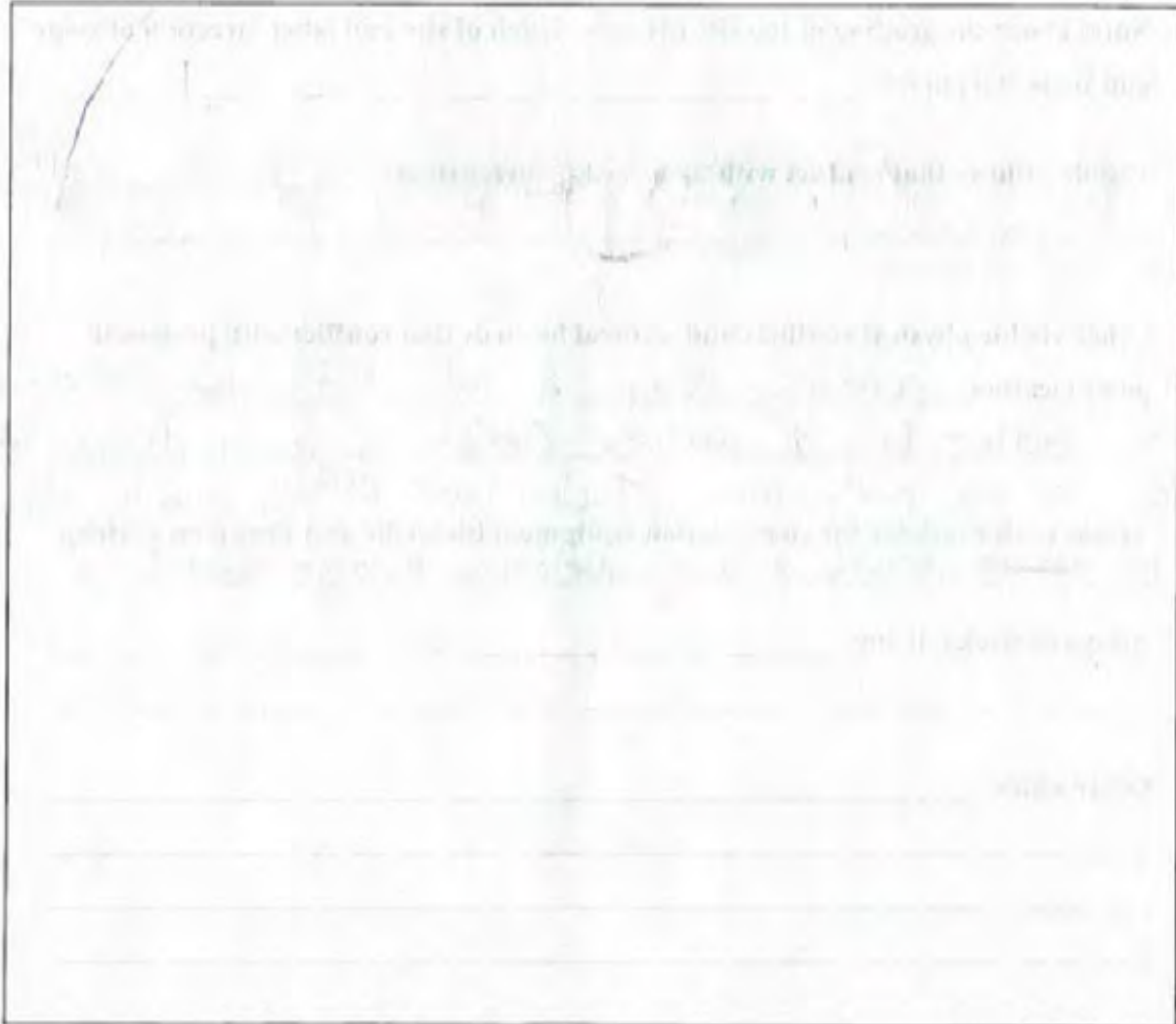
Size / dimensions of other outlet structures: \_\_\_\_\_

estimate width of wing wall back is ~ 5m

Other descriptions: \_\_\_\_\_

### SKETCH OF SUBJECT AREA

Label site grading (including slope steepness), potential construction equipment access paths, observed utilities, observed natural hazards and other physical obstacles, outlet location, north arrow.



#176



7.→



## Field Inspection Form – Uncontrolled Areas

Uncontrolled Outlet ID # 176  
General location / Major Intersection Green Lane & Alex's  
Date Nov 14/12  
Inspection Completed By Leticia & Melody

### LAND CONDITIONS

#### Existing Land Use:

Residential ☐ Commercial ☐ Industrial ☐ Parkland/Open Space ☒  
Mix ☐ (describe) \_\_\_\_\_

Amount of space available to construct a stormwater management facility: \_\_\_\_\_

Factors that may limit the amount of space available: Creeks, private lots  
w/ steep slope.

Notes about the grading of the site (draw a sketch of site and label direction of slope and slope steepness): \_\_\_\_\_

Visible utilities that conflict with proposed pond location: \_\_\_\_\_  
none

Other visible physical conflicts and natural hazards that conflict with proposed pond location: steep slopes by private property

= creeks  
- floodplain likely - what return period?

Access path available for construction equipment (describe and shown on sketch):

from green lane, slope is likely flat enough as is but could  
make an access rd. likely.

Access obstacles, if any: \_\_\_\_\_  
no access from Richview Ct.

Other notes: possibility to pipe d/s into open  
space if space right @ outlet is  
too limited Not an option b/c  
that open space is @ a higher  
elevation than valley  
→ retaining wall instead of slopes @ property line?



### **STORM SEWER OUTLET**

Description of outlet structures and shapes: outlet in wingwall of bridge

Description of outlet materials: concrete

Size of outlet pipe: 1.2m $\phi$

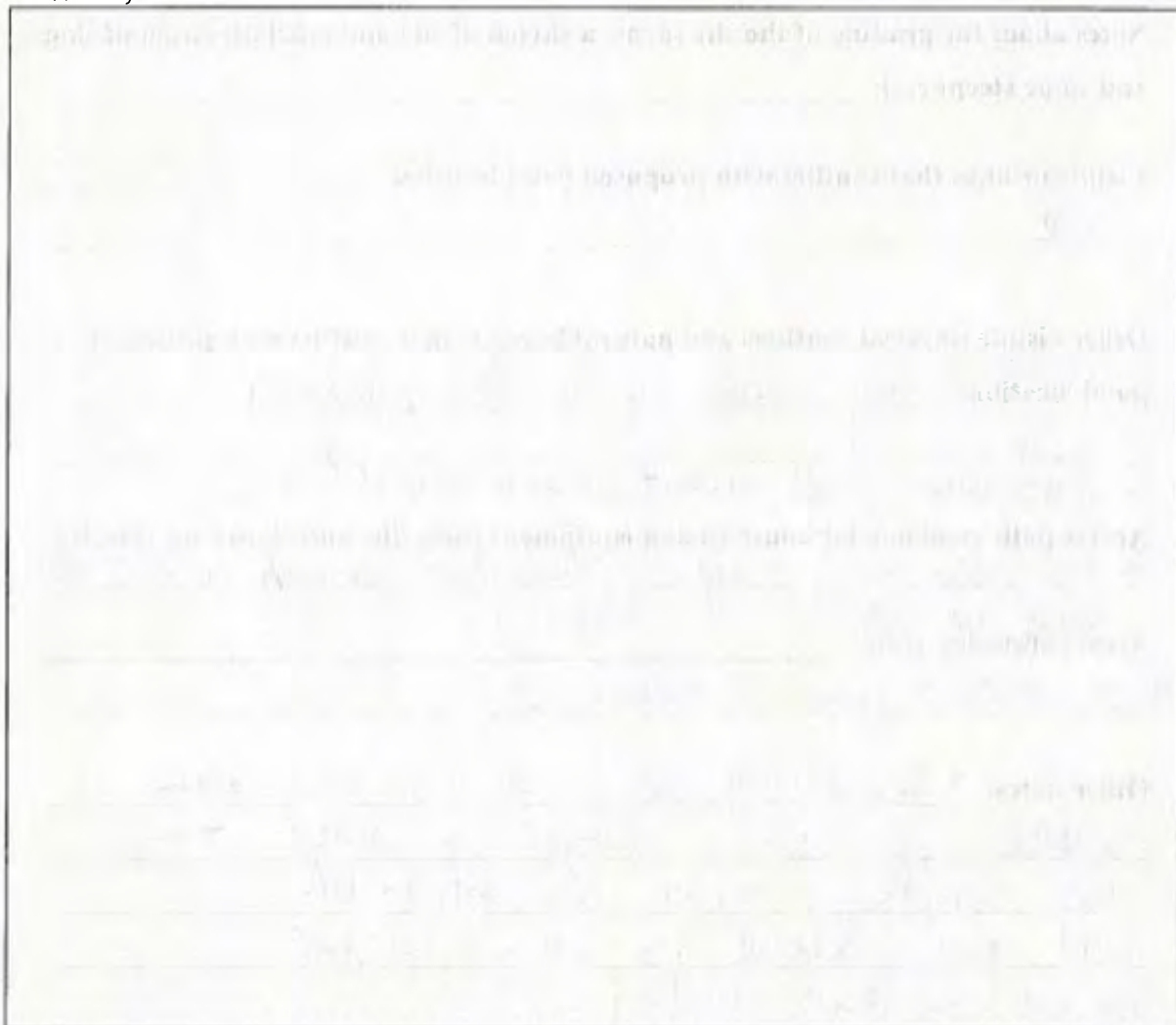
Size / dimensions of other outlet structures: \_\_\_\_\_

double ~~or~~ culvert under green lane

Other descriptions: \_\_\_\_\_

### **SKETCH OF SUBJECT AREA**

Label site grading (including slope steepness), potential construction equipment access paths, observed utilities, observed natural hazards and other physical obstacles, outlet location, north arrow.



## **APPENDIX D**

### **Screening Process Details and Rational**

Is the pond a municipally owned / assumed pond?

| PondID | Facility Name                                            | Facility Status | Removed from Consideration? |
|--------|----------------------------------------------------------|-----------------|-----------------------------|
| 1      | Pond 2A - Buttonville Mdp                                | Assumed         | No                          |
| 2      | Pond 2B - Buttonville Mdp                                | Assumed         | No                          |
| 3      | Pond 2C - Buttonville Mdp                                | Assumed         | No                          |
| 4      | Pond 2D - Buttonville Mdp                                | Assumed         | No                          |
| 5      | Pond 2E - Buttonville Mdp                                | Assumed         | No                          |
| 6      | Pond 2F - Buttonville Mdp                                | Assumed         | No                          |
| 7      | Se Quadrant Browns Corners                               | Assumed         | No                          |
| 8      | Markville Centre                                         | Assumed         | No                          |
| 9      | East Pond - Galleria Development (Leichcroft Farm)       | Assumed         | No                          |
| 11     | Northeast Markham - Mt. Joy Pond                         | Assumed         | No                          |
| 12     | Northeast Markham - West Pond                            | Assumed         | No                          |
| 13     | Northeast Markham - East Pond                            | Assumed         | No                          |
| 14     | Pond 1001 - Markham Study Area 1A                        | Assumed         | No                          |
| 15     | Pond 1002 - Markham Study Area 1A                        | Assumed         | No                          |
| 16     | Pond 1003S1 - Markham Study Area 1A                      | Assumed         | No                          |
| 18     | Pond 1005 - Markham Study Area 1A                        | Assumed         | No                          |
| 19     | Pond 1006                                                | Assumed         | No                          |
| 20     | Pond 1007N - Markham Study Area 1A                       | Assumed         | No                          |
| 21     | Pond 1007S - Markham Study Area 1A                       | Assumed         | No                          |
| 23     | Pond 4 - Thornlea East Community                         | Assumed         | No                          |
| 24     | Pond 3 - Thornlea East Community                         | Assumed         | No                          |
| 25     | Pond 2 - Leitchcroft Farm/Teubner Industrial Subdivision | Assumed         | No                          |
| 27     | Beaver Creek - Pond 3                                    | Assumed         | No                          |
| 30     | Concanmar Industrial Subd.                               | Assumed         | No                          |
| 31     | East Risebrough Phase 1 North Park Pond                  | Assumed         | No                          |
| 32     | East Risebrough Phase 1 South Park Pond                  | Assumed         | No                          |
| 33     | West Risebrough North Detention Pond                     | Assumed         | No                          |
| 34     | West Risebrough South Detention Pond                     | Assumed         | No                          |
| 35     | West Risborough Phase 1 - North Facility                 | Assumed         | No                          |
| 36     | West Risebrough Phase 1 - South Facility                 | Assumed         | No                          |
| 37     | Hagerman Estates Subd.                                   | Assumed         | No                          |
| 38     | Bridle Trail Phase 3 Pond                                | Assumed         | No                          |
| 39     | Bridle Trail Phase 4 Pond                                | Assumed         | No                          |
| 40     | Bridle Trail Phase 5 Pond                                | Assumed         | No                          |
| 41     | Markfarm Developments Pond                               | Assumed         | No                          |
| 42     | Robinson Creek - Raymerville Community Pond              | Assumed         | No                          |
| 43     | Civic Centre Pond (Pond 3 Of Study Area 1C)              | Assumed         | No                          |
| 44     | B-3 Subdivision                                          | Assumed         | No                          |
| 45     | Pond B - H&R Developments                                | Assumed         | No                          |
| 46     | Pond C - H&R Developments                                | Assumed         | No                          |
| 47     | Demarco/Webjo Development Pond                           | Assumed         | No                          |
| 48     | Cachet Woods Phase 2 Pond                                | Assumed         | No                          |
| 49     | Crupi Subdivision Pond                                   | Assumed         | No                          |
| 50     | Ascot Village Pond                                       | Assumed         | No                          |
| 51     | Rouge River Fairways Minor System Pond                   | Assumed         | No                          |
| 52     | Old Mill Pond - Minto Markham Partnership                | Assumed         | No                          |
| 53     | Tomlinson Pond - Minto Markham Partnership               | Assumed         | No                          |
| 55     | Subdivision 19T-95063 Pond                               | Assumed         | No                          |
| 56     | Daniels Rouge Subdivision Pond                           | Assumed         | No                          |
| 57     | Berczy Village - Pond A                                  | Assumed         | No                          |
| 59     | Berczy Village - Pond I                                  | Assumed         | No                          |
| 60     | South Unionville Secondary Plan (Opa 22) Pond 7          | Assumed         | No                          |
| 61     | South Unionville Secondary Plan (Opa 22) Interim Pond    | Assumed         | No                          |
| 62     | North Pond- Markham Study Area 1A                        | Assumed         | No                          |
| 63     | Pond 2002 - Markham Study Area 1A                        | Assumed         | No                          |
| 64     | Pond 2006 - Markham Study Area 1A                        | Assumed         | No                          |
| 65     | Village in the Valley - South Park                       | Assumed         | No                          |
| 66     | Village in the Valley - East Park                        | Assumed         | No                          |
| 67     | Buttonville Business Park Pond 2G                        | Assumed         | No                          |
| 68     | Block 2068 Pond                                          | Assumed         | No                          |
| 69     | Greensborough Pond E                                     | Assumed         | No                          |
| 70     | Carlton Village Stage 9 Pond                             | Assumed         | No                          |
| 71     | BERCZY VILLAGE - POND "J"                                | Assumed         | No                          |
| 72     | York Downs - Pond H                                      | Assumed         | No                          |
| 73     | East Cathedral Azuria POND E2                            | Assumed         | No                          |
| 74     | Greensborough Phase 2 - Pond B                           | Assumed         | No                          |
| 75     | Berczy Village Pond C                                    | Assumed         | No                          |
| 76     | East Cathedral Pond E1                                   | Assumed         | No                          |
| 77     | Angus Glen Pond A                                        | Assumed         | No                          |
| 78     | Wismer Common - Pond 5                                   | Assumed         | No                          |
| N/A    | Markham Municipal Centre                                 | Assumed         | No                          |
| N/A    | Villages of Fairtree                                     | Assumed         | No                          |
| N/A    | Normandale Pond                                          | Assumed         | No                          |
| 10     | West Pond - Galleria Development (Leichcroft Farm)       | Private         | Yes                         |
| 17     | Pond 1003N - Markham Study Area                          | Private         | Yes                         |
| 22     | Markham Place Private Pond                               | Private         | Yes                         |
| 26     | Beaver Creek Mdp Pond 1                                  | Private         | Yes                         |
| 28     | Beaver Creek Mdp Pond 4A (Private Pond)                  | Private         | Yes                         |
| 29     | Beaver Creek Mdp Pond 4B (Private Pond)                  | Private         | Yes                         |
| 54     | Markham Centre - Pond 1 East (Private Pond))             | Private         | Yes                         |
| 58     | Berczy Village - Pond B2                                 | Private         | Yes                         |
| 79     | Unknown                                                  | Unassumed       | Yes                         |
| 80     | Lindvest Pond A                                          | Unassumed       | Yes                         |
| 81     | Lindvest Pond B                                          | Unassumed       | Yes                         |



| PondID | Facility Name                              | Facility Status | Removed from Consideration? |
|--------|--------------------------------------------|-----------------|-----------------------------|
| 82     | West Cathedral Pond W1                     | Unassumed       | Yes                         |
| 83     | West Cathedral Pond E3                     | Unassumed       | Yes                         |
| 84     | West Cathedral Pond E4                     | Unassumed       | Yes                         |
| 86     | Wismer Commons Pond 3                      | Unassumed       | Yes                         |
| 85     | Cornell Community- Tributary C             | Unassumed       | Yes                         |
| 87     | 404 North Interim Pond L1                  | Unassumed       | Yes                         |
| 88     | 404 North Interim B3                       | Unassumed       | Yes                         |
| 89     | Angus Glen West Village Pond A             | Unassumed       | Yes                         |
| 90     | Wismer Commons Pond 1                      | Unassumed       | Yes                         |
| 91     | Wismer Commons Pond 2                      | Unassumed       | Yes                         |
| 92     | Wismer Commons Pond 4                      | Unassumed       | Yes                         |
| 93     | Wismer Commons Pond 6                      | Unassumed       | Yes                         |
| 94     | Cornell Community tributary 1- Area 6 Pond | Unassumed       | Yes                         |
| 95     | North Greensborough Pond D                 | Unassumed       | Yes                         |
| 96     | Box Grove Pond 1                           | Unassumed       | Yes                         |
| 97     | Box Grove Pond 2                           | Unassumed       | Yes                         |
| 98     | Box Grove Pond 3                           | Unassumed       | Yes                         |
| 99     | Box Grove Pond 4                           | Unassumed       | Yes                         |
| 100    | Box Grove Pond 5                           | Unassumed       | Yes                         |
| 101    | Box Grove Pond 6                           | Unassumed       | Yes                         |
| 102    | Greensborough Avida Pond                   | Unassumed       | Yes                         |
| 103    | Greensborough Pond A                       | Unassumed       | Yes                         |
| 104    | Unknown                                    | Unassumed       | Yes                         |
| 105    | Unknown                                    | Unassumed       | Yes                         |
| 107    | Angus Glen Pond C                          | Unassumed       | Yes                         |
| 106    | Angus Glen West Village Temporary Pond B   | Unassumed       | Yes                         |
| 108    | Greensborough Pond C                       | Unassumed       | Yes                         |

Has the pond been previously retrofit to meet current SWM standards?

| PondID | Facility Name                                            | Previously Retrofitted? | Removed from Consideration? |
|--------|----------------------------------------------------------|-------------------------|-----------------------------|
| 1      | Pond 2A - Buttonville Mdp                                | No                      | No                          |
| 2      | Pond 2B - Buttonville Mdp                                | No                      | No                          |
| 3      | Pond 2C - Buttonville Mdp                                | No                      | No                          |
| 4      | Pond 2D - Buttonville Mdp                                | No                      | No                          |
| 5      | Pond 2E - Buttonville Mdp                                | No                      | No                          |
| 6      | Pond 2F - Buttonville Mdp                                | No                      | No                          |
| 8      | Markville Centre                                         | No                      | No                          |
| 11     | Northeast Markham - Mt. Joy Pond                         | No                      | No                          |
| 12     | Northeast Markham - West Pond                            | No                      | No                          |
| 13     | Northeast Markham - East Pond                            | No                      | No                          |
| 14     | Pond 1001 - Markham Study Area 1A                        | No                      | No                          |
| 15     | Pond 1002 - Markham Study Area 1A                        | No                      | No                          |
| 16     | Pond 1003S1 - Markham Study Area 1A                      | No                      | No                          |
| 18     | Pond 1005 - Markham Study Area 1A                        | No                      | No                          |
| 19     | Pond 1006                                                | No                      | No                          |
| 20     | Pond 1007N - Markham Study Area 1A                       | No                      | No                          |
| 21     | Pond 1007S - Markham Study Area 1A                       | No                      | No                          |
| 23     | Pond 4 - Thornlea East Community                         | No                      | No                          |
| 24     | Pond 3 - Thornlea East Community                         | No                      | No                          |
| 31     | East Risebrough Phase 1 North Park Pond                  | No                      | No                          |
| 32     | East Risebrough Phase 1 South Park Pond                  | No                      | No                          |
| 33     | West Risebrough North Detention Pond                     | No                      | No                          |
| 34     | West Risebrough South Detention Pond                     | No                      | No                          |
| 35     | West Risborough Phase 1 - North Facility                 | No                      | No                          |
| 36     | West Risebrough Phase 1 - South Facility                 | No                      | No                          |
| 37     | Hagerman Estates Subd.                                   | No                      | No                          |
| 38     | Bridle Trail Phase 3 Pond                                | No                      | No                          |
| 39     | Bridle Trail Phase 4 Pond                                | No                      | No                          |
| 41     | Markfarm Developments Pond                               | No                      | No                          |
| 42     | Robinson Creek - Raymerville Community Pond              | No                      | No                          |
| 45     | Pond B - H&R Developments                                | No                      | No                          |
| 46     | Pond C - H&R Developments                                | No                      | No                          |
| 47     | Demarco/Webjo Development Pond                           | No                      | No                          |
| 48     | Cachet Woods Phase 2 Pond                                | No                      | No                          |
| 49     | Crupi Subdivision Pond                                   | No                      | No                          |
| 50     | Ascot Village Pond                                       | No                      | No                          |
| 51     | Rouge River Fairways Minor System Pond                   | No                      | No                          |
| 52     | Old Mill Pond - Minto Markham Partnership                | No                      | No                          |
| 53     | Tomlinson Pond - Minto Markham Partnership               | No                      | No                          |
| 55     | Subdivision 19T-95063 Pond                               | No                      | No                          |
| 56     | Daniels Rouge Subdivision Pond                           | No                      | No                          |
| 57     | Berczy Village - Pond A                                  | No                      | No                          |
| 59     | Berczy Village - Pond I                                  | No                      | No                          |
| 60     | South Unionville Secondary Plan (Opa 22) Pond 7          | No                      | No                          |
| 61     | South Unionville Secondary Plan (Opa 22) Interim Pond    | No                      | No                          |
| 62     | North Pond- Markham Study Area 1A                        | No                      | No                          |
| 63     | Pond 2002 - Markham Study Area 1A                        | No                      | No                          |
| 64     | Pond 2006 - Markham Study Area 1A                        | No                      | No                          |
| 65     | Village in the Valley - South Park                       | No                      | No                          |
| 66     | Village in the Valley - East Park                        | No                      | No                          |
| 67     | Buttonville Business Park Pond 2G                        | No                      | No                          |
| 68     | Block 2068 Pond                                          | No                      | No                          |
| 69     | Greensborough Pond E                                     | No                      | No                          |
| 71     | BERCZY VILLAGE - POND "J"                                | No                      | No                          |
| 72     | York Downs - Pond H                                      | No                      | No                          |
| 73     | East Cathedral Azuria POND E2                            | No                      | No                          |
| 74     | Greensborough Phase 2 - Pond B                           | No                      | No                          |
| 75     | Berczy Village Pond C                                    | No                      | No                          |
| 76     | East Cathedral Pond E1                                   | No                      | No                          |
| 77     | Angus Glen Pond A                                        | No                      | No                          |
| 78     | Wismer Common - Pond 5                                   | No                      | No                          |
| N/A    | Markham Municipal Centre                                 | No                      | No                          |
| N/A    | Villages of Fairtree                                     | No                      | No                          |
| N/A    | Normandale Pond                                          | No                      | No                          |
| 7      | Se Quadrant Browns Corners                               | Yes                     | Yes                         |
| 9      | East Pond - Galleria Development (Leichcroft Farm)       | Yes                     | Yes                         |
| 25     | Pond 2 - Leitchcroft Farm/Teubner Industrial Subdivision | Yes                     | Yes                         |
| 27     | Beaver Creek - Pond 3                                    | Yes                     | Yes                         |
| 30     | Concanmar Industrial Subd.                               | Yes                     | Yes                         |
| 40     | Bridle Trail Phase 5 Pond                                | Yes                     | Yes                         |
| 43     | Civic Centre Pond (Pond 3 Of Study Area 1C)              | Yes                     | Yes                         |
| 44     | B-3 Subdivision                                          | Yes                     | Yes                         |
| 70     | Carlton Village Stage 9 Pond                             | Yes                     | Yes                         |

Provides adequate sediment removal?  
Provides adequate erosion control?  
Quantity control meets site specific criteria?  
Temperature control not an issue (includes Redside Dace considerations)? Are temperature control measures present?

| PondID | Facility Name                       | Adequate Sediment Removal? | Sediment Removal Provided                                                                                                                                                                                               | Adequate Erosion Control? | Erosion Control Provided                           | Quantity Control Meets Site Specific Criteria? | Quantity Control Provided                                                                                                                                                                                                                   | Temperature Control an Issue and Not Adequately Provided? | Temperature control an issue? Temperature control provided.                                                      | Removed From Consideration?                                                                                            |
|--------|-------------------------------------|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|----------------------------------------------------|------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| 1      | Pond 2A - Buttonville Mdp           | No                         | Retrofit to make water quality pond but not wet pond. 1992 report recommends adding a PP to balance deficit in ponds 2C (Pond #3), 2D (Pond #4) and 2G.                                                                 | No                        | None , report does not mention any erosion control | Yes                                            | 2 year. Ponds 2A through 2F meet overall requirements.                                                                                                                                                                                      | Yes                                                       | Downstream receiving watercourse is Redside Dace habitat.                                                        | No                                                                                                                     |
| 2      | Pond 2B - Buttonville Mdp           | No                         | Permanent pool volume in SWMSoft.                                                                                                                                                                                       | No                        | None , report does not mention any erosion control | Yes                                            | 2 year. Ponds 2A through 2F meet overall requirements.                                                                                                                                                                                      | Yes                                                       | Downstream receiving watercourse is Redside Dace habitat.                                                        | No                                                                                                                     |
| 3      | Pond 2C - Buttonville Mdp           | No                         | Permanent pool volume in SWMSoft                                                                                                                                                                                        | No                        | None , report does not mention any erosion control | Yes                                            | 2 year. Ponds 2A through 2F meet overall requirements.                                                                                                                                                                                      | Yes                                                       | Downstream receiving watercourse is Redside Dace habitat.                                                        | No                                                                                                                     |
| 4      | Pond 2D - Buttonville Mdp           | No                         | 2 m3/ha, required is 55 m3/ha. 1998 report recommended adding permanent pool to 2A to compensate.                                                                                                                       | No                        | None                                               | Yes                                            | 31 000 m3 of storage during 100 year. Rouge is post to pre for 2 to 100 year. For Applewood 2 year reduced to 3.1 m3/s and 100 year reduced to 24.3 m3/s at its confluence with Rouge River. Ponds 2A through 2F meet overall requirements. | Yes                                                       | Downstream receiving watercourse is Redside Dace habitat.                                                        | No                                                                                                                     |
| 5      | Pond 2E - Buttonville Mdp           | Yes                        | Permanent pool volume in SWMSoft but 1998 report and MDP listed it as a dry, onstream facility. SWMsoft states PP of 1,084 m3. According to SWMsoft data (10% imperv & 10ha minor DA) a PP of 557 m3 would be required. | No                        | None , report does not mention any erosion control | Yes                                            | 2 year. Ponds 2A through 2F meet overall requirements.                                                                                                                                                                                      | Yes                                                       | Downstream receiving watercourse is Redside Dace habitat.                                                        | No                                                                                                                     |
| 6      | Pond 2F - Buttonville Mdp           | Yes                        | 170 m3/ha with a 12 h drawdown time                                                                                                                                                                                     | Yes                       | 25 mm active storage volume released over 48 h     | Yes                                            | 1998 updated Master Plan addendum/1997 report states the pond accommodates the 2 to 100 year events, post to pre.                                                                                                                           | No                                                        | Downstream receiving watercourse is Redside Dace habitat. Plantings in wetland area. Thermal analysis completed. | Yes                                                                                                                    |
| 8      | Markville Centre                    | Yes                        | No forebay. SWMsoft states PP of 27,319 m3. According to SWMsoft data (55% imperv & 67.1 ha minor DA) a PP of 10,050 m3 would be required.                                                                              | No                        | None, flood control pond                           | Unknown                                        | Unknown level of control                                                                                                                                                                                                                    | No                                                        |                                                                                                                  | No                                                                                                                     |
| 11     | Northeast Markham - Mt. Joy Pond    | Yes                        | According to data in SWMsoft (based on minor system drainage area only).                                                                                                                                                | No                        | None, flood control pond                           | No                                             | 5 year and less post to pre                                                                                                                                                                                                                 | No                                                        |                                                                                                                  | No                                                                                                                     |
| 12     | Northeast Markham - West Pond       | N/A                        | Not required (does not receive minor system flow.                                                                                                                                                                       | N/A                       | Not required (does not receive minor system flow.  | Yes                                            | Controls runoff for 100 or 25 yr stm, minor storms in pipes only. Available storage is 14.2 ac.ft. Not required as per TRCA (2012)                                                                                                          | No                                                        |                                                                                                                  | Yes                                                                                                                    |
| 13     | Northeast Markham - East Pond       | Yes                        | Provided by pond #62                                                                                                                                                                                                    | Yes                       | Provided by pond #62                               | Yes                                            | Controls runoff for 100 or 25 yr stm, minor storms in pipes only. Available storage is 22.8 ac.ft. Not required as per TRCA (2012)                                                                                                          | No                                                        |                                                                                                                  | Yes                                                                                                                    |
| 14     | Pond 1001 - Markham Study Area 1A   | Yes                        | Provided by pond #62                                                                                                                                                                                                    | Yes                       | Provided by pond #62                               | No                                             | Under sized (11,900 m3 provided, 15,200 m3 required, release controlled for 26 h detention).                                                                                                                                                | Yes                                                       | Downstream receiving watercourse is possibly Redside Dace habitat.                                               | No                                                                                                                     |
| 15     | Pond 1002 - Markham Study Area 1A   | Yes                        | Provided by pond #62                                                                                                                                                                                                    | Yes                       | Provided by pond #62                               | Yes                                            | 10,060 m3 provided for 100 year to control to required minor system rates and road flow depths                                                                                                                                              | No                                                        |                                                                                                                  | Yes                                                                                                                    |
| 16     | Pond 1003S1 - Markham Study Area 1A | Yes                        | Provided by pond #62                                                                                                                                                                                                    | Yes                       | Provided by pond #62                               | Yes                                            | 9000 m3 (100 year detained 24 h)                                                                                                                                                                                                            | No                                                        |                                                                                                                  | Yes                                                                                                                    |
| 18     | Pond 1005 - Markham Study Area 1A   | Unknown                    | Downstream SWMP not in SWMSoft                                                                                                                                                                                          | Unknown                   | Downstream SWMP not in SWMSoft                     | Yes                                            | 8230 m3 to meet required release rate.                                                                                                                                                                                                      | No                                                        |                                                                                                                  | Yes - Only flood control provided and outleted to the minor system (CBs). Outlets to a SWMP downstream that are not in |
| 19     | Pond 1006                           | Unknown                    | Downstream SWMP not in SWMSoft                                                                                                                                                                                          | Unknown                   | Downstream SWMP not in SWMSoft                     | No                                             | Design 4,807 m3, required 7000 m3                                                                                                                                                                                                           | No                                                        |                                                                                                                  |                                                                                                                        |



| PondID | Facility Name                               | Adequate Sediment Removal? | Sediment Removal Provided                                                                                                 | Adequate Erosion Control? | Erosion Control Provided                                                                                    | Quantity Control Meets Site Specific Criteria? | Quantity Control Provided                                                                                                                             | Temperature Control an Issue and Not Adequately Provided? | Temperature control an issue? Temperature control provided.        | Removed From Consideration?                                                                                                                                                                                                                              |
|--------|---------------------------------------------|----------------------------|---------------------------------------------------------------------------------------------------------------------------|---------------------------|-------------------------------------------------------------------------------------------------------------|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 20     | Pond 1007N - Markham Study Area 1A          | Unknown                    | Downstream SWMP not in SWMSOFT                                                                                            | Unknown                   | Downstream SWMP not in SWMSOFT                                                                              | No                                             | Post to pre up to 25                                                                                                                                  | No                                                        |                                                                    | SWMSOFT and we do not have any information about. Assumed that these downstream ponds are privately owned and cannot be                                                                                                                                  |
| 21     | Pond 1007S - Markham Study Area 1A          | Unknown                    | Downstream SWMP not in SWMSOFT                                                                                            | Unknown                   | Downstream SWMP not in SWMSOFT                                                                              | No                                             | Doesn't meet standard. 3,800 m3 provided.                                                                                                             | No                                                        |                                                                    |                                                                                                                                                                                                                                                          |
| 23     | Pond 4 - Thornlea East Community            | No                         | None                                                                                                                      | No                        | None                                                                                                        | Unknown                                        | Unit flow equation required, TRCA (2012)                                                                                                              | Yes                                                       | Downstream receiving watercourse is possibly Redside Dace habitat. | No                                                                                                                                                                                                                                                       |
| 24     | Pond 3 - Thornlea East Community            | No                         | Inadequate                                                                                                                | No                        | None                                                                                                        | No                                             | 2 year post to pre                                                                                                                                    | No                                                        |                                                                    | No                                                                                                                                                                                                                                                       |
| 31     | East Risebrough Phase 1 North Park Pond     | Yes                        | Not required because minor system doesn't outlet here                                                                     | N/A                       | Not required because minor system doesn't outlet here                                                       | Yes                                            | Major controlled in parks. For minor CB's controlled to 28 l/s (Scarborough sewer allocation)                                                         | No                                                        |                                                                    | Yes                                                                                                                                                                                                                                                      |
| 32     | East Risebrough Phase 1 South Park Pond     | Yes                        | Not required because minor system doesn't outlet here                                                                     | N/A                       | Not required because minor system doesn't outlet here                                                       | Yes                                            | Major controlled in parks. For minor CB's controlled to 28 l/s (Scarborough sewer allocation)                                                         | No                                                        |                                                                    | Yes                                                                                                                                                                                                                                                      |
| 33     | West Risebrough North Detention Pond        | N/A                        | None                                                                                                                      | N/A                       | None                                                                                                        | Yes                                            | 2 to 100 post to pre (minor in superpipes, major in park)                                                                                             | No                                                        |                                                                    | Yes - because outlets to City of Toronto sewers. The receiving system (sewers) is not a sensitive feature (not the natural environment) therefore quality and erosion control is not an issue. Additionally there could potentially be a facility at the |
| 34     | West Risebrough South Detention Pond        | N/A                        | None                                                                                                                      | N/A                       | None                                                                                                        | Yes                                            | 2 to 100 post to pre (minor in superpipes, major in park)                                                                                             | No                                                        |                                                                    |                                                                                                                                                                                                                                                          |
| 35     | West Risebrough Phase 1 - North Facility    | N/A                        | None                                                                                                                      | N/A                       | None                                                                                                        | N/A                                            | control runoff for 100 or 25 yr storm, minor storms in pipes only.                                                                                    | No                                                        |                                                                    |                                                                                                                                                                                                                                                          |
| 36     | West Risebrough Phase 1 - South Facility    | N/A                        | None                                                                                                                      | N/A                       | None                                                                                                        | N/A                                            | control runoff for 100 or 25 yr storm, minor storms in pipes only.                                                                                    | No                                                        |                                                                    |                                                                                                                                                                                                                                                          |
| 37     | Hagerman Estates Subd.                      | No                         | Unknown - no bathymetric survey so PP is also unknown.                                                                    | No                        | Unknown                                                                                                     | Yes                                            | Not required as per TRCA (2012)                                                                                                                       | Yes                                                       | Downstream receiving watercourse is possibly Redside Dace habitat. | No                                                                                                                                                                                                                                                       |
| 38     | Bridle Trail Phase 3 Pond                   | No                         | None                                                                                                                      | No                        | None, flood control pond                                                                                    | Yes                                            | 2 year event post to pre. Not required as per TRCA (2012)                                                                                             | No                                                        |                                                                    | No                                                                                                                                                                                                                                                       |
| 39     | Bridle Trail Phase 4 Pond                   | No                         | None                                                                                                                      | No                        | None, flood control pond                                                                                    | Yes                                            | Additional volume in Phase 3 pond (#38) to offset Phase 4 lack of space. Criteria used was post to pre for 2yr storm. Not required as per TRCA (2012) | No                                                        |                                                                    | No                                                                                                                                                                                                                                                       |
| 41     | Markfarm Developments Pond                  | Yes                        | Not required because minor system doesn't outlet here                                                                     | N/A                       | Not required because minor system doesn't outlet here                                                       | Yes                                            | 100 year storage shown on drawing.                                                                                                                    | No                                                        |                                                                    | Yes                                                                                                                                                                                                                                                      |
| 42     | Robinson Creek - Raymerville Community Pond | No                         | None, dry pond                                                                                                            | No                        | None, flood control pond                                                                                    | No                                             | 2 year post to pre                                                                                                                                    | Yes                                                       | Downstream receiving watercourse is Redside Dace habitat.          | No                                                                                                                                                                                                                                                       |
| 45     | Pond B - H&R Developments                   | No                         | None                                                                                                                      | No                        | None, flood control pond                                                                                    | Yes                                            | 100 year storage shown on drawing.                                                                                                                    | Yes                                                       | Downstream receiving watercourse is possibly Redside Dace habitat. | No                                                                                                                                                                                                                                                       |
| 46     | Pond C - H&R Developments                   | No                         | Inadequate                                                                                                                | No                        | None, flood control pond                                                                                    | Yes                                            | Not required b/c d/s of Major Mack as per TRCA (2012)                                                                                                 | Yes                                                       | Downstream receiving watercourse is possibly Redside Dace habitat. | No                                                                                                                                                                                                                                                       |
| 47     | Demarco/Webjo Development Pond              | No                         | SWMSOFT states PP of 1,155 m3. According to SWMSOFT data (45% imperv & 23ha minor DA) a PP of 2,766 m3 would be required. | No                        | 25 mm, 24 h detention                                                                                       | Yes                                            | Not required b/c d/s of Major Mack as per TRCA (2012)                                                                                                 | Yes                                                       | Downstream receiving watercourse is possibly Redside Dace habitat. | No                                                                                                                                                                                                                                                       |
| 48     | Cachet Woods Phase 2 Pond                   | Yes                        | Level 1                                                                                                                   | No                        | 25 mm 4 h, 24 h detention                                                                                   | Yes                                            | Controlling 5 year peak flows, major discharges to creek. Report states quantity control wasn't required.                                             | Yes                                                       | Downstream receiving watercourse is Redside Dace habitat.          | No                                                                                                                                                                                                                                                       |
| 49     | Crupi Subdivision Pond                      | No                         | 25 mm, 24 h detention                                                                                                     | No                        | 25 mm, 24 h detention                                                                                       | No                                             |                                                                                                                                                       | Yes                                                       | Downstream receiving watercourse is possibly Redside Dace habitat. | No                                                                                                                                                                                                                                                       |
| 50     | Ascot Village Pond                          | Yes                        | Permanent pool volume in SWMSOFT                                                                                          | No                        | None, quality control pond                                                                                  | No                                             | Unit flow equation required, TRCA (2012)                                                                                                              | No                                                        |                                                                    | No                                                                                                                                                                                                                                                       |
| 51     | Rouge River Fairways Minor System Pond      | No                         | 25 mm, 24 h detention (no permanent pool)                                                                                 | No                        | 25 mm, 24 h detention, 1988 report states "2 year level is required from MTRCA for erosion control purpose" | Yes                                            | Not required b/c d/s of Major Mack as per TRCA (2012)                                                                                                 | Yes                                                       | Downstream receiving watercourse is possibly Redside Dace habitat. | No                                                                                                                                                                                                                                                       |

| PondID | Facility Name                                         | Adequate Sediment Removal? | Sediment Removal Provided                                                                                                                                                                                                                                                        | Adequate Erosion Control? | Erosion Control Provided              | Quantity Control Meets Site Specific Criteria? | Quantity Control Provided                                                                                                                                                                                                                                                                                     | Temperature Control an Issue and Not Adequately Provided? | Temperature control an issue? Temperature control provided.                                                                                                                                                             | Removed From Consideration?                     |
|--------|-------------------------------------------------------|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|---------------------------------------|------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|
| 52     | Old Mill Pond - Minto Markham Partnership             | Yes                        | 13 mm detained and released over 24 h as per interim MNR/MOE requirements for warm water watercourse (since 25 mm 2 h is larger that became criteria). SWMsoft states PP of 5,557 m3. According to SWMsoft data (45% imperv & 38ha minor DA) a PP of 4,735 m3 would be required. | No                        | 25 mm 2 h event retained for 24 h     | Yes                                            | Not required because Level 3 stream, described in 1994 SWM report                                                                                                                                                                                                                                             | Yes                                                       | Downstream receiving watercourse is possibly Redside Dace habitat.                                                                                                                                                      | No                                              |
| 53     | Tomlinson Pond - Minto Markham Partnership            | Yes                        | 13 mm detained and released over 24 h as per interim MNR/MOE requirements for warm water watercourse (since 25 mm 2 h is larger that became criteria)                                                                                                                            | No                        | 25 mm 2 h event retained for 24 h     | Yes                                            | Not required because Level 3 stream, described in 1994 SWM report                                                                                                                                                                                                                                             | Yes                                                       | Downstream receiving watercourse is possibly Redside Dace habitat.                                                                                                                                                      | No                                              |
| 55     | Subdivision 19T-95063 Pond                            | Yes                        | Level 1 MOE 1994, provides 105 m3/ha. SWMsoft % imperv is 45 and Minor DA is 5ha, SWMsoft provided PP is 614m3 and 623m3 is needed. 99% of reqd PP is provided so this is adequate.                                                                                              | No                        | Greater of 25 mm or 40 m3/ha for 24 h | No                                             |                                                                                                                                                                                                                                                                                                               | No                                                        | Downstream receiving watercourse is possibly Redside Dace habitat. Plantings for shading                                                                                                                                | No                                              |
| 56     | Daniels Rouge Subdivision Pond                        | No                         | Level 1, MOE 1994 (65m3/ha for wetland)                                                                                                                                                                                                                                          | No                        | 25 mm, 32 h draw down                 | NO                                             | Report states not required in accordance with the Comprehensive Basin Management Strategy for the Rouge River Watershed.                                                                                                                                                                                      | No                                                        | Downstream receiving watercourse is possibly Redside Dace habitat. Amount of open water's minimized, deep pool with bottom draw outlet. Existing mature vegetation surrounding site, additional vegetation for shading. | No                                              |
| 57     | Berczy Village - Pond A                               | Yes                        | Level 1 MOE June 1994 standards. 92.5ha drainage area, 54% imperviousness, design PP of 13,650 m3 with forbay. Confirmed this meets current standards.                                                                                                                           | Yes                       | 25 mm 4 h storm, 48 h drain time      | Yes                                            | Post to pre up to 5 year. Major system flows are routed directly into watercourse. Up to 100 yr post to pre peak flows are match for watercourse flows immediately upstream of 16th Ave (as required by "Environmental Management Plan for Urban Expansion Areas, Volume 5, Town of Markham, November 1994"). | No                                                        | Bottom draw outlet, planting that shades inlet and outlet                                                                                                                                                               | Yes                                             |
| 59     | Berczy Village - Pond I                               | No                         | Level 1 MOE standards, 1994                                                                                                                                                                                                                                                      | Yes                       | 25 mm 4 h storm, 48 h drain time      | Yes                                            | Post to pre up to 100 year                                                                                                                                                                                                                                                                                    | No                                                        | Downstream receiving watercourse is possibly Redside Dace habitat. Bottom draw outlet, planting that shades inlet and outlet                                                                                            | No                                              |
| 60     | South Unionville Secondary Plan (Opa 22) Pond 7       | Yes                        | Yes - Level 1 MOE standards, 1994. Confirmed this meets current standards.                                                                                                                                                                                                       | Yes                       | 25 mm, released over 62 h             | Yes                                            | Post to pre up to 100 year                                                                                                                                                                                                                                                                                    | No                                                        | Bottom draw outlet, planting that shades inlet and outlet                                                                                                                                                               | Yes                                             |
| 61     | South Unionville Secondary Plan (Opa 22) Interim Pond | N/A                        |                                                                                                                                                                                                                                                                                  | N/A                       |                                       | N/A                                            |                                                                                                                                                                                                                                                                                                               | N/A                                                       |                                                                                                                                                                                                                         | Yes - because this is a temporary SWM facility. |
| 62     | North Pond- Markham Study Area 1A                     | Yes                        | SWMsoft states PP of 78,408 m3. According to SWMsoft data (40% imperv & 573.7ha minor DA) a PP of 64,300 m3 would be required.                                                                                                                                                   | No                        | 25 mm, 24 h detention time            | Yes                                            | Post to pre 2 to 100                                                                                                                                                                                                                                                                                          | Yes                                                       | Downstream receiving watercourse is Redside Dace habitat.                                                                                                                                                               | No                                              |
| 63     | Pond 2002 - Markham Study Area 1A                     | Yes                        | Pond 62                                                                                                                                                                                                                                                                          | Yes                       | Pond 62                               | Yes                                            | 9,560 m3 active storage with a 24 h drawdown provided, summary notes more required                                                                                                                                                                                                                            | No                                                        |                                                                                                                                                                                                                         | Yes                                             |

| PondID | Facility Name                      | Adequate Sediment Removal? | Sediment Removal Provided                                                                                                                                                                 | Adequate Erosion Control? | Erosion Control Provided                                                                                                                                                                                                                | Quantity Control Meets Site Specific Criteria? | Quantity Control Provided                                                                                                                                                                                                                                                                                                                                                                             | Temperature Control an Issue and Not Adequately Provided? | Temperature control an issue? Temperature control provided.                                                                                                                                                | Removed From Consideration?                                                                                                                                                                                                              |
|--------|------------------------------------|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 64     | Pond 2006 - Markham Study Area 1A  | N/A                        | Outlets to pond not in SWMSoft                                                                                                                                                            | N/A                       | Outlets to pond not in SWMSoft                                                                                                                                                                                                          | Yes                                            | 15,900 m3                                                                                                                                                                                                                                                                                                                                                                                             | No                                                        |                                                                                                                                                                                                            | Yes - because outlets to a SWMP downstream that is not in SWMsoft and we do not have any information about. Assumed that these downstream ponds are privately owned and cannot be retrofitted, and that they are adequately constructed. |
| 65     | Village in the Valley - South Park | N/A                        | Could be provided by a proposed uncontrolled outlet.                                                                                                                                      | N/A                       | Could be provided by a proposed uncontrolled outlet.                                                                                                                                                                                    | Yes                                            | 4400 m3. Overland flows from 26.5 ha. Control to 100 year.                                                                                                                                                                                                                                                                                                                                            | No                                                        |                                                                                                                                                                                                            | Yes - because outlets to an uncontrolled area where we are proposing a new SWM facility.                                                                                                                                                 |
| 66     | Village in the Valley - East Park  | N/A                        | Could be provided by a proposed uncontrolled outlet.                                                                                                                                      | N/A                       | Could be provided by a proposed uncontrolled outlet.                                                                                                                                                                                    | Yes                                            | Slight undercontrol up to 10 year, slight overcontrol 25 to 100 year.                                                                                                                                                                                                                                                                                                                                 | No                                                        |                                                                                                                                                                                                            | Yes - because outlets to an uncontrolled area where we are proposing a new SWM facility.                                                                                                                                                 |
| 67     | Buttonville Business Park Pond 2G  | No                         | 40 m3/ha but require 100 m3/ha                                                                                                                                                            | No                        | 25 mm event over 30 h                                                                                                                                                                                                                   | Yes                                            | Pond not designed for quantity control. All major system flows are directed to pond 2F located in the business park.                                                                                                                                                                                                                                                                                  | No                                                        | Downstream receiving watercourse is Redside Dace habitat. Canopy cover over wetland area                                                                                                                   | No                                                                                                                                                                                                                                       |
| 68     | Block 2068 Pond                    | Yes                        | Pond 62                                                                                                                                                                                   | Yes                       | Pond 62                                                                                                                                                                                                                                 | Yes                                            | Pond 62                                                                                                                                                                                                                                                                                                                                                                                               | No                                                        |                                                                                                                                                                                                            | Yes                                                                                                                                                                                                                                      |
| 69     | Greensborough Pond E               | Yes                        | Level 1                                                                                                                                                                                   | Yes                       | 25 mm released over 48 h                                                                                                                                                                                                                | Yes                                            | 2 to 100 year post to pre                                                                                                                                                                                                                                                                                                                                                                             | No                                                        | Bottom draw outlet and planting to shade inlet and outlet                                                                                                                                                  | Yes                                                                                                                                                                                                                                      |
| 71     | BERCZY VILLAGE - POND "J"          | Yes                        | Yes, Level 1. Confirmed that provided permanent pool meets current (2003) standards.                                                                                                      | Yes                       | 25 mm 4 h storm, 48 h drawdown                                                                                                                                                                                                          | No                                             | Post to pre 5 year provided as per ESMS. Controls minor system only. Post to pre to 100 year required as per TRCA (2012).                                                                                                                                                                                                                                                                             | No                                                        | Downstream receiving watercourse is Redside Dace habitat. Planting for shading of inlet and outlet, bottom draw outlet                                                                                     | Yes - because major quantity is controlled by online facility downstream that controls post to pre 10 year to 100 year at 16th Ave so can be removed because overall system meets what it's designed to do.                              |
| 72     | York Downs - Pond H                | Yes                        | Forebay. Correspondence for Kylemore Facility to the south says it doesn't need quantity or quality control because Pond 'H' aka 72 overcontrols.                                         | Yes                       | Extended detention water level shown on drawings. Environmental Management Plan (1994) says that it should be designed for 2 h 25 mm rainfall event to be released over 24 h but Kylemore FSR says it was designed for 4 h 25 mm event. | Yes                                            | Correspondence for Kylemore Facility to the south says it doesn't need quantity or quality control because Pond 'H' aka 72 overcontrols. Environmental Management Plan (1994) says that post to pre for 2 through 100 year events. According to Jylemore FSR it was designed for 72 h extended detention with a retrofit proposed in Kylemore FSR, extended detention calcs provided in Attachment 6. | No                                                        | Downstream receiving watercourse is Redside Dace habitat. Outlet 1 m from bottom of pond. Has a stone outfall trench (50 mm diameter clearstone that's 450 mm deep) so this could act as a cooling trench. | Yes                                                                                                                                                                                                                                      |
| 73     | East Cathedral Azuria POND E2      | Yes                        | Level 1. SWMsoft states PP of 6,475 m3. According to SWMsoft data (40% imperv & 25.7ha minor DA) a PP of 2,692 m3 would be required. (Major DA=59.2ha, so then req'd PP would be 6,202m3) | No                        | Greater of MOE Guideline and 30 mm runoff, which was 30 mm runoff retained for 40 h                                                                                                                                                     | Yes                                            | Post to pre for the 2 through to 5 yr events. Greater than 5 yr events spill into OL-E2 pond (online SWM pond on the west side of Pond 73 and east side of Woodbine Ave) that controls flows 2 to 100 post to pre.                                                                                                                                                                                    | No                                                        | Downstream receiving watercourse is possibly Redside Dace habitat. Considered in design. Planting plans, bottom draw outlet, graded as deep as possible                                                    | No                                                                                                                                                                                                                                       |
| 74     | Greensborough Phase 2 - Pond B     | Yes                        | Level 1                                                                                                                                                                                   | Yes                       | 25 mm 4 h event released over 48 h                                                                                                                                                                                                      | Yes                                            | Flows in excess of 25 mm event up to 100 year flow through overflow spillway into Little Rouge Creek as per EMDP. 2 to 100 post to pre required as per TRCA 2012.                                                                                                                                                                                                                                     | No                                                        | Planting for shading of inlet and outlet, bottom draw outlet.                                                                                                                                              | Yes                                                                                                                                                                                                                                      |
| 75     | Berczy Village Pond C              | Yes                        | Level 1 MOE standards, 1994                                                                                                                                                               | Yes                       | Yes, 25 mm 4 h, 48 h drawdown                                                                                                                                                                                                           | Yes                                            | Minor pond, in conjunction with d/s facilities will control up to 100 yr post to pre at 16th                                                                                                                                                                                                                                                                                                          | No                                                        | Provided - bottom draw and shading                                                                                                                                                                         | Yes                                                                                                                                                                                                                                      |
| 76     | East Cathedral Pond E1             | Yes                        | Level 1. 2 forebays.                                                                                                                                                                      | Yes                       | 30 mm rainfall runoff for at least 40 h                                                                                                                                                                                                 | Yes                                            | E1 provides for 5 year. E1 and OL-E1 will maintain 2 to 100 year flows post to pre.                                                                                                                                                                                                                                                                                                                   | No                                                        | Downstream receiving watercourse is possibly Redside Dace habitat. Planting plans, bottom draw outlet, graded as deep as possible                                                                          | Yes                                                                                                                                                                                                                                      |



| PondID | Facility Name                                 | Adequate Sediment Removal? | Sediment Removal Provided                                                                                                                                                                                                                                 | Adequate Erosion Control?                                   | Erosion Control Provided                                                                                                                     | Quantity Control Meets Site Specific Criteria? | Quantity Control Provided                                                                                                                                                                                                                  | Temperature Control an Issue and Not Adequately Provided? | Temperature control an issue? Temperature control provided.                                                                      | Removed From Consideration? |
|--------|-----------------------------------------------|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| 77     | Angus Glen Pond A                             | Yes                        | Level 1                                                                                                                                                                                                                                                   | Yes                                                         | 25 mm 2 h released over 48 h                                                                                                                 | Yes                                            | Post to pre up to 100 year                                                                                                                                                                                                                 | Yes                                                       | Downstream receiving watercourse is Redside Dace habitat. Bottom draw outlet but pond appears to not have very much shade cover. | No                          |
| 78     | Wismer Common - Pond 5                        | Yes                        | Outlets to another pond.                                                                                                                                                                                                                                  | Yes                                                         | Outlets to another pond.                                                                                                                     | Yes                                            | Flows in excess of 5 year from 21 ha, storage volume is 4552 m3. Meets 100 year target outflows outlines in "Environmental and Stormwater Management Study, Wismer Commons, January 1998" by Schaeffers & Assoc. Ltd. Post to pre at 16th. | No                                                        |                                                                                                                                  | Yes                         |
| N/A    | Markham Municipal Centre                      | No                         | Aesthetic pond                                                                                                                                                                                                                                            | No                                                          | Aesthetic pond                                                                                                                               | No                                             | 2 year post to pre. Limiting the 25 year flow entering truck sewer to 11.4 m3/s                                                                                                                                                            | No                                                        |                                                                                                                                  | No                          |
| N/A    | Villages of Fairtree Subdivision - South Pond | Yes                        | PP exceeds 37,300 m3, required volume is 37,500 m3 according to 278.2ha DA and 49% imperv (as per South Pond Retrofit Report April 2002). Given the scale of the pond, site constraints, and how marginally off the PP is, this is deemed to be adequate. | Yes                                                         | 33 mm 48 h. TRCA suggested 33mm instead of 25mm in order to further reduce erosion downstream (as per South Pond Retrofit Report April 2002) | Yes                                            | Post to pre 100 year                                                                                                                                                                                                                       | No                                                        |                                                                                                                                  | Yes                         |
| 111-A  | Normandale Pond                               | No                         | Unknown - pond has a permanent pool but no bathymetric survey or SWM report is available.                                                                                                                                                                 | Unknown and no additional information available, assume no. | Unknown - pond has no SWM report is available.                                                                                               | No                                             | Pond drawing contains a 10-yr water line.                                                                                                                                                                                                  | No                                                        | Some trees surrounding pond.                                                                                                     | No                          |

Site Access?  
Land Available?  
Natural Hazards Impact Design?

| PondID | Facility Name                     | Open Space?             | Public / Utility Land | Private property with open | Natural Hazards Slopes            | Notes                                                                                                                                                                                                                                            | Removed From Consideration?          |
|--------|-----------------------------------|-------------------------|-----------------------|----------------------------|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
| 1      | Pond 2A - Buttonville Mdp         | Yes                     | No                    | No                         | 20% to 25%                        |                                                                                                                                                                                                                                                  |                                      |
| 2      | Pond 2B - Buttonville Mdp         | No, unless online       | No                    | No                         |                                   | There is really no existing SWM pond, it's a watercourse. The space between the properties is constrained                                                                                                                                        | Yes - not enough space for retrofit. |
| 3      | Pond 2C - Buttonville Mdp         | No, unless online       | No                    | No                         |                                   | There is really no existing SWM pond, it's a watercourse. The space between the properties is constrained                                                                                                                                        | Yes - not enough space for retrofit. |
| 4      | Pond 2D - Buttonville Mdp         | Yes, existing pond area | No                    | No                         | 13% pond side slopes              | Existing pond is fairly large and could do retrofit within this area, online pond though                                                                                                                                                         | No                                   |
| 5      | Pond 2E - Buttonville Mdp         | No                      | Yes                   |                            | Flat other than side slopes (25%) | Can be made offline. Park space, some open, baseball diamond, soccer fields                                                                                                                                                                      | No                                   |
| 8      | Markville Centre                  | Yes                     | No                    | No                         | Flat                              |                                                                                                                                                                                                                                                  | No                                   |
| 11     | Northeast Markham - Mt. Joy Pond  | No                      | No                    | No                         |                                   | No space available for expansion. Drainage area and any details of the pond are unknown. If additional volume needed was very small and could fit within pond this would be feasible, but because this cannot be confirmed this is screened out. | No                                   |
| 14     | Pond 1001 - Markham Study Area 1A | No                      | Yes                   | No                         |                                   | Park, would be either on soccer fields or baseball diamond, probably soccer fields                                                                                                                                                               | Yes - not enough space for retrofit. |
| 23     | Pond 4 - Thornlea East Community  | Yes                     | Yes                   | No                         | 4%                                | Park with play structure, some manicured open space to south                                                                                                                                                                                     | No                                   |
| 24     | Pond 3 - Thornlea East Community  | Yes                     | No                    | No                         | 35%                               | Limited space                                                                                                                                                                                                                                    | No                                   |
| 37     | Hagerman Estates Subd.            | No                      | Yes                   | No                         | 6%                                | Hydro corridor                                                                                                                                                                                                                                   | No                                   |
| 38     | Bridle Trail Phase 3 Pond         | Yes                     | Yes                   | No                         | 2%                                | Wooded area, park nearby                                                                                                                                                                                                                         | No                                   |

| PondID | Facility Name                               | Open Space? | Public / Utility Land | Private property with open   | Natural Hazards Slopes                       | Notes                                                                          | Removed From Consideration?          |
|--------|---------------------------------------------|-------------|-----------------------|------------------------------|----------------------------------------------|--------------------------------------------------------------------------------|--------------------------------------|
| 39     | Bridle Trail Phase 4 Pond                   | Yes         | No                    | Yes                          | 4%                                           | Open space and schoolyard with soccer field                                    | No                                   |
| 42     | Robinson Creek - Raymerville Community Pond | Yes         | No                    | No                           | 8%                                           | wetland/meadow                                                                 | No                                   |
| 45     | Pond B - H&R Developments                   | No          | Yes                   | No                           | 2% to 19%                                    | Park with open space                                                           | No                                   |
| 46     | Pond C - H&R Developments                   | No          | No                    | No                           |                                              | Open space but not enough available                                            | Yes - not enough space for retrofit. |
| 47     | Demarco/Webjo Development Pond              | Yes         | Yes                   | No                           | 5%                                           | Park, some expansion area, forest area around but likely cannot expand there   | No                                   |
| 48     | Cachet Woods Phase 2 Pond                   | Yes         | No                    | No                           | varied                                       | Surrounded by mature forest                                                    | No                                   |
| 49     | Crupi Subdivision Pond                      | No          | No                    | No                           | 25%                                          | Open space is limited                                                          | Yes - not enough space for retrofit. |
| 50     | Ascot Village Pond                          | No          | No                    | No                           |                                              | Open space is limited                                                          | Yes - not enough space for retrofit. |
| 51     | Rouge River Fairways Minor System Pond      | Yes         | No                    | No                           | Flat                                         | Open space                                                                     | No                                   |
| 52     | Old Mill Pond - Minto Markham Partnership   | yes         | Yes (City)            |                              | Pond at the top of a 20% hill                | Adjacent to golf course.                                                       | No                                   |
| 53     | Tomlinson Pond - Minto Markham Partnership  | yes         | Yes (City)            |                              | flat                                         | Within golf course.                                                            | No                                   |
| 55     | Subdivision 19T-95063 Pond                  | Yes         | No                    | No                           | 4% one side, 20% downstream side             | Open space                                                                     | No                                   |
| 56     | Daniels Rouge Subdivision Pond              | Yes         | Yes (public)          |                              | In bottom of ravine with steep ravine sides. | Access is difficult. Must travel a distance through forest to get to location. | Yes - access limitations.            |
| 59     | Berczy Village - Pond I                     | no          |                       | no space available to expand |                                              | Paved trail network around pond.                                               | Yes - not enough space for retrofit. |
| 62     | North Pond- Markham Study Area 1A           | No          | No                    | Yes                          | 3% to 7%                                     | Private open space, retrofit likely won't require much if any additional space | No                                   |
| 67     | Buttonville Business Park Pond 2G           | No          | Yes                   | No                           | flat                                         | Park, minimal space required                                                   | No                                   |
| 73     | East Cathedral Azuria POND E2               | yes         | Yes (public)          |                              | 10%                                          |                                                                                | No                                   |
| 77     | Angus Glen Pond A                           | Yes         | Yes (City)            | Yes                          | Relatively flat                              |                                                                                | No                                   |
| N/A    | Markham Municipal Centre                    | No          | No                    | No                           |                                              |                                                                                | Yes - not enough space for retrofit. |
| 111-A  | Normandale Pond                             |             |                       |                              |                                              |                                                                                | No                                   |



### Uncontrolled Outlet Screening

| Uncontrolled outlet ID | Removed from Consideration Through Pre-Screening? | Drainage Area Greater than 5 ha? | Land Availability? | Steep Slope or Grading Constraints? | Site Access | Natural Hazards / Resources Impact Design? | Remove from Consideration? |
|------------------------|---------------------------------------------------|----------------------------------|--------------------|-------------------------------------|-------------|--------------------------------------------|----------------------------|
| 1                      | Yes                                               |                                  |                    |                                     | Yes         |                                            | Yes                        |
| 2                      | Yes                                               |                                  |                    |                                     | Yes         |                                            | Yes                        |
| 3                      | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 4                      | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 5                      | Yes                                               |                                  |                    |                                     | Yes         |                                            | Yes                        |
| 6                      | Yes                                               |                                  |                    |                                     | Yes         |                                            | Yes                        |
| 7                      | Yes                                               |                                  |                    |                                     | Yes         |                                            | Yes                        |
| 8                      | No                                                | Yes                              | Yes                | No                                  | Yes         | No                                         | No                         |
| 9                      | Yes                                               |                                  |                    |                                     | Yes         |                                            | Yes                        |
| 10                     | Yes                                               |                                  |                    |                                     | Yes         |                                            | Yes                        |
| 11                     | Yes                                               |                                  |                    |                                     | Yes         |                                            | Yes                        |
| 12                     | Yes                                               |                                  |                    |                                     | Yes         |                                            | Yes                        |
| 13                     | Yes                                               |                                  |                    |                                     | Yes         |                                            | Yes                        |
| 14                     | Yes                                               |                                  |                    |                                     | Yes         |                                            | Yes                        |
| 15                     | Yes                                               |                                  |                    |                                     | Yes         |                                            | Yes                        |
| 16                     | No                                                | No                               | No                 |                                     | Yes         |                                            | Yes                        |
| 17                     | Yes                                               |                                  |                    |                                     | Yes         |                                            | Yes                        |
| 18                     | No                                                | Yes                              | No                 |                                     | Yes         |                                            | Yes                        |
| 19                     | Yes                                               |                                  |                    |                                     | Yes         |                                            | Yes                        |
| 20                     | No                                                |                                  | No                 |                                     | Yes         |                                            | Yes                        |
| 21                     | Yes                                               |                                  |                    |                                     | Yes         |                                            | Yes                        |
| 22                     | Yes                                               |                                  |                    |                                     | Yes         |                                            | Yes                        |
| 23                     | Yes                                               |                                  |                    |                                     | Yes         |                                            | Yes                        |
| 24                     | Yes                                               |                                  |                    |                                     | Yes         |                                            | Yes                        |
| 25                     | Yes                                               |                                  |                    |                                     | Yes         |                                            | Yes                        |
| 26                     | Yes                                               |                                  |                    |                                     | Yes         |                                            | Yes                        |
| 27                     | Yes                                               |                                  |                    |                                     | Yes         |                                            | Yes                        |
| 28                     | Yes                                               |                                  |                    |                                     | Yes         |                                            | Yes                        |
| 29                     | Yes                                               |                                  |                    |                                     | Yes         |                                            | Yes                        |
| 30                     | Yes                                               |                                  |                    |                                     | Yes         |                                            | Yes                        |
| 31                     | No                                                |                                  | No                 | Yes                                 |             |                                            | Yes                        |
| 32                     | No                                                | Yes                              | Yes                | Yes                                 | Yes         |                                            | Yes                        |
| 33                     | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 34                     | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 35                     | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 36                     | No                                                |                                  | Yes                | Yes                                 |             |                                            | Yes                        |
| 37                     | No                                                |                                  | Yes                | Yes                                 |             |                                            | Yes                        |
| 38                     | No                                                |                                  |                    | Yes                                 |             |                                            | Yes                        |
| 39                     | No                                                | Yes                              |                    | Yes                                 |             |                                            | Yes                        |
| 40                     | No                                                | Yes                              | No                 | Yes                                 |             |                                            | Yes                        |
| 41                     | No                                                | Yes                              |                    | Yes                                 |             |                                            | Yes                        |
| 42                     | No                                                | Yes                              | Yes                |                                     | No          |                                            | Yes                        |
| 43                     | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 44                     | No                                                | Yes                              | No                 |                                     |             |                                            | Yes                        |
| 45                     | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 46                     | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 47                     | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 48                     | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 49                     | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 50                     | No                                                | Yes                              | Yes                |                                     |             |                                            | Yes                        |
| 51                     | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 52                     | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 53                     | No                                                | Yes                              | Yes                | Yes                                 |             |                                            | Yes                        |
| 54                     | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 55                     | No                                                | Yes                              | Yes                | No                                  | Yes         | No                                         | No                         |

### Uncontrolled Outlet Screening

| Uncontrolled outlet ID | Removed from Consideration Through Pre-Screening? | Drainage Area Greater than 5 ha? | Land Availability? | Steep Slope or Grading Constraints? | Site Access | Natural Hazards / Resources Impact Design? | Remove from Consideration? |
|------------------------|---------------------------------------------------|----------------------------------|--------------------|-------------------------------------|-------------|--------------------------------------------|----------------------------|
| 56                     | No                                                | Yes                              | Yes                |                                     |             | Yes                                        | Yes                        |
| 57                     | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 58                     | No                                                | Yes                              | No                 |                                     |             |                                            | Yes                        |
| 59                     | No                                                | Yes                              | No                 |                                     |             |                                            | Yes                        |
| 60                     | No                                                | Yes                              | No                 |                                     |             |                                            | Yes                        |
| 61                     | No                                                | Yes                              | No                 |                                     |             |                                            | Yes                        |
| 62                     | No                                                |                                  | No                 |                                     |             |                                            | Yes                        |
| 63                     | No                                                | Yes                              | Yes                | No                                  | Yes         | No                                         | No                         |
| 64                     | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 65                     | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 66                     | No                                                | Yes                              | Yes                | No                                  | Yes         | No                                         | No                         |
| 67                     | No                                                | Yes                              |                    | Yes                                 |             |                                            | Yes                        |
| 68                     | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 69                     | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 70                     | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 71                     | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 72                     | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 73                     | No                                                | Yes                              | No                 |                                     |             |                                            | Yes                        |
| 74                     | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 75                     | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 76                     | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 77                     | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 78                     | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 79                     | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 80                     | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 81                     | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 82                     | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 83                     | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 84                     | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 85                     | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 86                     | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 87                     | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 88                     | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 89                     | No                                                | Yes                              | No                 | Yes                                 |             |                                            | Yes                        |
| 90                     | No                                                |                                  | No                 | Yes                                 |             |                                            | Yes                        |
| 91                     | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 92                     | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 93                     | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 94                     | No                                                | Yes                              | Yes                | No                                  | Yes         | No                                         | No                         |
| 95                     | No                                                | Yes                              | No                 |                                     |             |                                            | Yes                        |
| 96                     | No                                                | Yes                              | No                 |                                     |             |                                            | Yes                        |
| 97                     | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 98                     | No                                                | Yes                              | No                 |                                     |             |                                            | Yes                        |
| 99                     | No                                                | No                               |                    |                                     |             |                                            | Yes                        |
| 100                    | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 101                    | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 102                    | No                                                |                                  |                    | Yes                                 |             |                                            | Yes                        |
| 103                    | No                                                | Yes                              | Yes                | No                                  | Yes         | No                                         | No                         |
| 104                    | No                                                | Yes                              | No                 |                                     |             |                                            | Yes                        |
| 105                    | No                                                | Yes                              | Yes                |                                     |             | Yes                                        | Yes                        |
| 106                    | No                                                | Yes                              | Yes                | No                                  | Yes         | No                                         | No                         |
| 107                    | No                                                | Yes                              | Yes                | Yes                                 |             |                                            | Yes                        |
| 108                    | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 109                    | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 110                    | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |

### Uncontrolled Outlet Screening

| Uncontrolled outlet ID | Removed from Consideration Through Pre-Screening? | Drainage Area Greater than 5 ha? | Land Availability? | Steep Slope or Grading Constraints? | Site Access | Natural Hazards / Resources Impact Design? | Remove from Consideration? |
|------------------------|---------------------------------------------------|----------------------------------|--------------------|-------------------------------------|-------------|--------------------------------------------|----------------------------|
| 111                    | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 112                    |                                                   | Yes                              | Yes                | No                                  | Yes         | No                                         | No                         |
| 113                    | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 114                    | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 115                    | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 116                    | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 117                    | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 118                    | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 119                    | No                                                |                                  | No                 | Yes                                 |             |                                            | Yes                        |
| 120                    | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 121                    | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 122                    | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 123                    | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 124                    | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 125                    | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 126                    | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 127                    | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 128                    | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 129                    | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 130                    | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 131                    | No                                                | Yes                              | Yes                | Yes                                 |             |                                            | Yes                        |
| 132                    | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 133                    | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 134                    | No                                                | Yes                              | Yes                |                                     |             | Yes                                        | Yes                        |
| 135                    | No                                                | Yes                              | No                 |                                     |             |                                            | Yes                        |
| 136                    | No                                                | Yes                              | No                 |                                     |             |                                            | Yes                        |
| 137                    | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 138                    | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 139                    | No                                                | No                               |                    |                                     |             |                                            | Yes                        |
| 140                    | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 141                    | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 142                    | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 143                    | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 144                    | No                                                | Yes                              |                    | Yes                                 |             |                                            | Yes                        |
| 145                    | No                                                | Yes                              | Yes                |                                     |             |                                            | Yes                        |
| 146                    | No                                                |                                  | No                 |                                     |             |                                            | Yes                        |
| 147                    | No                                                |                                  | Yes                | Yes                                 |             |                                            | Yes                        |
| 148                    | No                                                | No                               |                    |                                     |             |                                            | Yes                        |
| 149                    | No                                                | Yes                              | No                 |                                     |             |                                            | Yes                        |
| 150                    | No                                                | Yes                              | Yes                | Yes                                 |             |                                            | Yes                        |
| 151                    | No                                                | Yes                              | Yes                | Yes                                 |             |                                            | Yes                        |
| 152                    | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 153                    | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 154                    | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 156                    | No                                                | No                               | No                 |                                     |             |                                            | Yes                        |
| 157                    | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 158                    | No                                                | Yes                              | No                 |                                     |             |                                            | Yes                        |
| 159                    | No                                                | Yes                              | Yes                | No                                  | Yes         | No                                         | No                         |
| 160                    | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 161                    | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 162                    | No                                                | Yes                              | Yes                | No                                  | Yes         | No                                         | No                         |
| 163                    | No                                                | Yes                              |                    |                                     | No          |                                            | Yes                        |
| 164                    | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 165                    | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 166                    | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |



### Uncontrolled Outlet Screening

| Uncontrolled outlet ID | Removed from Consideration Through Pre-Screening? | Drainage Area Greater than 5 ha? | Land Availability? | Steep Slope or Grading Constraints? | Site Access | Natural Hazards / Resources Impact Design? | Remove from Consideration? |
|------------------------|---------------------------------------------------|----------------------------------|--------------------|-------------------------------------|-------------|--------------------------------------------|----------------------------|
| 167                    | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 168                    | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 169                    | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 170                    | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 171                    | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 172                    | Yes                                               |                                  |                    |                                     |             |                                            | Yes                        |
| 173                    | No                                                | Yes                              | No                 | Yes                                 |             |                                            | Yes                        |
| 174                    | No                                                |                                  |                    | Yes                                 | Yes         | Yes                                        | Yes                        |
| 175                    | No                                                | Yes                              | Yes                | Yes                                 |             |                                            | Yes                        |
| 176                    | No                                                | Yes                              | Yes                | No                                  | Yes         | No                                         | No                         |
| 177                    | No                                                |                                  |                    | Yes                                 |             |                                            | Yes                        |
| 178                    | No                                                | No                               |                    |                                     | 8.37        |                                            | Yes                        |
| 179                    | No                                                | No                               |                    |                                     | Yes         |                                            | Yes                        |

**APPENDIX E**  
**Prioritization of Retrofit And New Construction**  
**Opportunities**

| Site ID            | Facility Name<br>(SWMSof Database)     | Year<br>Assumed | Year Built | Facility Type       | Watershed                                                                                                        | Quality Control<br>Upgrade<br>Required                                                                                              | Technical<br>Rational        | Erosion Control<br>Upgrade<br>Required                                                                                              | Technical Rational                                                                                                                              | Quantity<br>Control<br>Upgrade<br>Required                                                                                          | Technical Rational                                                                                                                                                                                     | Temperature<br>Mitigation<br>Upgrade<br>Required | Technical<br>Rational                                                                        | Cost Order of<br>Magnitude              | Property<br>Acquisition<br>Anticipated | ELC / SAR / ESA                                                                                                                                                       | Archeological /Cultural                                                                                                                              | Total<br>Prioitization<br>Score | Ranking |
|--------------------|----------------------------------------|-----------------|------------|---------------------|------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|----------------------------------------------------------------------------------------------|-----------------------------------------|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|---------|
|                    |                                        |                 |            |                     |                                                                                                                  | Yes, no control<br>currently<br>provided = 1,<br>Yes, some level<br>of control<br>currently<br>provided = #>0<br>but #<1,<br>No = 0 |                              | Yes, no control<br>currently<br>provided = 1,<br>Yes, some level<br>of control<br>currently<br>provided = #>0<br>but #<1,<br>No = 0 |                                                                                                                                                 | Yes, no control<br>currently<br>provided = 1,<br>Yes, some level<br>of control<br>currently<br>provided = #>0<br>but #<1,<br>No = 0 |                                                                                                                                                                                                        | Yes = 1, No = 0                                  |                                                                                              | Low = 1,<br>Moderate = 0.5,<br>High = 0 | No = 1, Yes =<br>0                     | Less Valued ELC and<br>no SAR / ESA = 1,<br>Less Valued ELC and<br>only Redside Dace<br>present = 0.5,<br>Valued ELC and/or<br>ESA and/or multiple<br>SAR present = 0 | No = 1,<br>Either Archeological or<br>Cultural Investigation<br>Required = 0.5,<br>Both Archaeological and<br>Cultural Investigation<br>Required = 0 |                                 |         |
| Criteria Weighting |                                        |                 |            |                     |                                                                                                                  | 15                                                                                                                                  |                              | 10                                                                                                                                  |                                                                                                                                                 | 15                                                                                                                                  |                                                                                                                                                                                                        | 10                                               |                                                                                              | 19                                      | 17                                     | 7                                                                                                                                                                     | 7                                                                                                                                                    | 100                             |         |
| UCO-176            |                                        |                 |            | Uncontrolled Outlet | German Mills of Don River Watershed                                                                              | 1.00                                                                                                                                | No quality control provided. | 1.00                                                                                                                                | No erosion control provided and is required.                                                                                                    | 0.00                                                                                                                                | No quantity control provided and is not adequate space available for a quantity control facility.                                                                                                      | 0.00                                             | MNR has identified this area is <i>unlikely</i> to be outletting to Redside Dace habitat.    | 0.50                                    | 1                                      | 1.00                                                                                                                                                                  | 0.00                                                                                                                                                 | 59                              | 1       |
| UCO-55             |                                        |                 |            | Uncontrolled Outlet | Upper East Don of Don River Watershed                                                                            | 1.00                                                                                                                                | No quality control provided. | 1.00                                                                                                                                | No erosion control provided and is required. There is adequate space for an erosion control facility that controls the minor system only.       | 0.00                                                                                                                                | No quantity control provided and is required but there is not adequate space available for a quantity control facility.                                                                                | 0.00                                             | MNR has identified this area is <i>unlikely</i> to be outletting to Redside Dace habitat.    | 0.50                                    | 1                                      | 1.00                                                                                                                                                                  | 0.00                                                                                                                                                 | 59                              | 2       |
| UCO-112            |                                        |                 |            | Uncontrolled Outlet | Berczy Creek of Rouge River Watershed                                                                            | 1.00                                                                                                                                | No quality control provided. | 1.00                                                                                                                                | No erosion control provided and is required.                                                                                                    | 0.00                                                                                                                                | No quantity control required downstream of Warden Avenue for Berczy Creek per draft 2012 TRCA SWM criteria.                                                                                            | 1.00                                             | MNR has identified downstream receiving watercourse as Redside Dace habitat.                 | 0.00                                    | 1                                      | 0.50                                                                                                                                                                  | 0.00                                                                                                                                                 | 56                              | 3       |
| UCO-94             |                                        |                 |            | Uncontrolled Outlet | Font Hill Creek of Rouge River Watercourse . Eastern edge of park is part of the Unionville Special Policy Area. | 1.00                                                                                                                                | No quality control provided. | 0.50                                                                                                                                | No erosion control provided and is required. However only partial erosion control can be achieved within space available.                       | 0.00                                                                                                                                | No quantity control provided and is required but there is not adequate space available for a quantity control facility.                                                                                | 0.50                                             | MNR has identified downstream receiving watercourse as <i>possibly</i> Redside Dace habitat. | 0.50                                    | 1                                      | 0.50                                                                                                                                                                  | 0.00                                                                                                                                                 | 55                              | 4       |
| P-51               | Rouge River Fairways Minor System Pond | 1993            | 1988       | Wetland             | Rouge River                                                                                                      | 1.00                                                                                                                                | No quality control provided. | 0.50                                                                                                                                | Current design provides 24 hr detention of the 25mm storm event. Increase in detention time recommended to meet TRCA's 2012 draft SWM criteria. | 0.00                                                                                                                                | Quantity control provided (post to pre) up to 2 year design event. No quantity control required downstream of Major Mackenzie Dr for the main channel of Rouge River per draft 2012 TRCA SWM criteria. | 0.50                                             | MNR has identified downstream receiving watercourse as <i>possibly</i> Redside Dace habitat. | 0.50                                    | 1                                      | 0.00                                                                                                                                                                  | 0.00                                                                                                                                                 | 52                              | 5       |
| UCO-66             |                                        |                 |            | Uncontrolled Outlet | Upper East Don of the Don River Watershed                                                                        | 1.00                                                                                                                                | No quality control provided. | 0.00                                                                                                                                | No erosion control provided and is required. However there is no space available for an erosion control facility without tree loss.             | 0.00                                                                                                                                | No quantity control provided and is required. However there is no space available for a quantity control facility without tree loss.                                                                   | 0.00                                             | MNR has identified this area is <i>unlikely</i> to be outletting to Redside Dace habitat.    | 1.00                                    | 1                                      | 0.00                                                                                                                                                                  | 0.00                                                                                                                                                 | 51                              | 6       |
| UCO-8              |                                        |                 |            | Uncontrolled Outlet | Beaver Creek of Rouge River Watershed                                                                            | 1.00                                                                                                                                | No quality control provided. | 0.75                                                                                                                                | No erosion control provided and is required. However only partial erosion control can be achieved without loss of trees.                        | 0.00                                                                                                                                | No quantity control required downstream of 16th Avenue for Beaver Creek per draft 2012 TRCA SWM criteria.                                                                                              | 1.00                                             | MNR has identified downstream receiving watercourse as Redside Dace habitat.                 | 0.00                                    | 1                                      | 0.00                                                                                                                                                                  | 0.00                                                                                                                                                 | 50                              | 7       |



| Site ID            | Facility Name<br>(SWMSoft Database) | Year Assumed       | Year Built | Facility Type       | Watershed                                     | Quality Control Upgrade Required                                                                            | Technical Rational                                                                                                                          | Erosion Control Upgrade Required                                                                            | Technical Rational                                                                                                                              | Quantity Control Upgrade Required                                                                           | Technical Rational                                                                                                                 | Temperature Mitigation Upgrade Required | Technical Rational                                                                                                                                                                                                         | Cost Order of Magnitude           | Property Acquisition Anticipated | ELC / SAR / ESA                                                                                                                                  | Archeological /Cultural                                                                                                            | Total Prioitization Score | Ranking |
|--------------------|-------------------------------------|--------------------|------------|---------------------|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|---------------------------|---------|
|                    |                                     |                    |            |                     |                                               | Yes, no control currently provided = 1, Yes, some level of control currently provided = #>0 but #<1, No = 0 |                                                                                                                                             | Yes, no control currently provided = 1, Yes, some level of control currently provided = #>0 but #<1, No = 0 |                                                                                                                                                 | Yes, no control currently provided = 1, Yes, some level of control currently provided = #>0 but #<1, No = 0 |                                                                                                                                    | Yes = 1, No = 0                         |                                                                                                                                                                                                                            | Low = 1, Moderate = 0.5, High = 0 | No = 1, Yes = 0                  | Less Valued ELC and no SAR / ESA = 1, Less Valued ELC and only Redside Dace present = 0.5, Valued ELC and/or ESA and/or multiple SAR present = 0 | No = 1, Either Archeological or Cultural Investigation Required = 0.5, Both Archaeological and Cultural Investigation Required = 0 | 100                       |         |
| Criteria Weighting |                                     |                    |            |                     |                                               | 15                                                                                                          |                                                                                                                                             | 10                                                                                                          |                                                                                                                                                 | 15                                                                                                          |                                                                                                                                    | 10                                      |                                                                                                                                                                                                                            | 19                                | 17                               | 7                                                                                                                                                | 7                                                                                                                                  |                           |         |
| P-77               | Angus Glen Pond A                   | Data not available | 2007       | Wet Pond            | Bruce Creek                                   | 0.00                                                                                                        | Current design provides adequate quality control.                                                                                           | 0.00                                                                                                        | Current design provides adequate erosion control.                                                                                               | 0.00                                                                                                        | Quantity control provided is adequate.                                                                                             | 1.00                                    | MNR has identified downstream receiving watercourse as Redside Dace habitat.                                                                                                                                               | 1.00                              | 1                                | 0.50                                                                                                                                             | 0.00                                                                                                                               | 50                        | 8       |
| P-45               | Pond B - H&R Developments           | 1987               | 1990       | Wetland             | Rouge River                                   | 1.00                                                                                                        | No quality control provided.                                                                                                                | 0.25                                                                                                        | There is not enough data is available to confirm if the current design provides erosion control.                                                | 0.00                                                                                                        | No quantity control required.                                                                                                      | 0.50                                    | MNR has identified downstream receiving watercourse as <i>possibly</i> Redside Dace habitat.                                                                                                                               | 0.50                              | 1                                | 0.00                                                                                                                                             | 0.00                                                                                                                               | 49                        | 9       |
| P-47               | Demarco/Webjo Development Pond      | 1994               | 1994       | Wet Pond            | Rouge River                                   | 0.50                                                                                                        | Current design provides 40% of the permanent pool volume that is required to satisfy current MOE guidelines for Enhanced (Level 1) control. | 0.50                                                                                                        | Current design provides 24 hr detention of the 25mm storm event. Increase in detention time recommended to meet TRCA's 2012 draft SWM criteria. | 0.00                                                                                                        | No quantity control required.                                                                                                      | 0.50                                    | MNR has identified downstream receiving watercourse as <i>possibly</i> Redside Dace habitat.                                                                                                                               | 0.50                              | 1                                | 0.50                                                                                                                                             | 0.00                                                                                                                               | 48                        | 10      |
| UCO-106            |                                     |                    |            | Uncontrolled Outlet | Berczy Creek of Rouge River Watershed         | 1.00                                                                                                        | No quality control provided.                                                                                                                | 0.00                                                                                                        | No erosion control provided and is required. However an erosion control facility cannot be provided without tree loss.                          | 0.00                                                                                                        | No quantity control required downstream of Warden Avenue for Berczy Creek per draft 2012 TRCA SWM criteria.                        | 0.50                                    | MNR has identified downstream receiving watercourse as Redside Dace habitat. However, minimal warming of stormwater occurs when surface storage is not occurring so temperature is not a significant concern at this site. | 0.50                              | 1                                | 0.00                                                                                                                                             | 0.00                                                                                                                               | 47                        | 11      |
| P-24               | Pond 3 - Thornlea East Community    | 1977               | 1977       | Wetland             | German Mills Creek of the Don River Watershed | 1.00                                                                                                        | Minimal quality control provided.                                                                                                           | 0.50                                                                                                        | No erosion control provided and is required however there is limited space for the required extended detention storage.                         | 0.00                                                                                                        | Some quantity control provided but inadequate. However there is no space available to provide additional quantity control storage. | 0.00                                    | MNR has identified this area is <i>unlikely</i> to be outletting to Redside Dace habitat.                                                                                                                                  | 0.50                              | 1                                | 0.00                                                                                                                                             | 0.00                                                                                                                               | 47                        | 12      |
| P-55               | Subdivision 19T-95063 Pond          | 1999               | 1999       | Wet Pond            | Rouge River                                   | 0.00                                                                                                        | Current design provides adequate quality control.                                                                                           | 0.50                                                                                                        | Current design provides 24 hr detention of the 25mm storm event. Increase in detention time recommended to meet TRCA's 2012 draft SWM criteria. | 0.00                                                                                                        | No quantity control required.                                                                                                      | 0.50                                    | MNR has identified downstream receiving watercourse as <i>possibly</i> Redside Dace habitat.                                                                                                                               | 1.00                              | 1                                | 0.00                                                                                                                                             | 0.00                                                                                                                               | 46                        | 13      |

| Site ID            | Facility Name<br>(SWMSoft Database)  | Year<br>Assumed       | Year Built | Facility Type       | Watershed                                      | Quality Control<br>Upgrade<br>Required                                                                                              | Technical<br>Rational                                   | Erosion Control<br>Upgrade<br>Required                                                                                              | Technical Rational                                                                                                                                                      | Quantity<br>Control<br>Upgrade<br>Required                                                                                          | Technical Rational                                                                                                                                                                                                                                                        | Temperature<br>Mitigation<br>Upgrade<br>Required | Technical<br>Rational                                                                                                                                                                                                                                                                                  | Cost Order of<br>Magnitude              | Property<br>Acquisition<br>Anticipated | ELC / SAR / ESA                                                                                                                                                       | Archeological /Cultural                                                                                                                              | Total<br>Prioitization<br>Score | Ranking |
|--------------------|--------------------------------------|-----------------------|------------|---------------------|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|---------|
|                    |                                      |                       |            |                     |                                                | Yes, no control<br>currently<br>provided = 1,<br>Yes, some level<br>of control<br>currently<br>provided = #>0<br>but #<1,<br>No = 0 |                                                         | Yes, no control<br>currently<br>provided = 1,<br>Yes, some level<br>of control<br>currently<br>provided = #>0<br>but #<1,<br>No = 0 |                                                                                                                                                                         | Yes, no control<br>currently<br>provided = 1,<br>Yes, some level<br>of control<br>currently<br>provided = #>0<br>but #<1,<br>No = 0 |                                                                                                                                                                                                                                                                           | Yes = 1, No = 0                                  |                                                                                                                                                                                                                                                                                                        | Low = 1,<br>Moderate = 0.5,<br>High = 0 | No = 1, Yes =<br>0                     | Less Valued ELC and<br>no SAR / ESA = 1,<br>Less Valued ELC and<br>only Redside Dace<br>present = 0.5,<br>Valued ELC and/or<br>ESA and/or multiple<br>SAR present = 0 | No = 1,<br>Either Archeological or<br>Cultural Investigation<br>Required = 0.5,<br>Both Archaeological and<br>Cultural Investigation<br>Required = 0 | 100                             |         |
| Criteria Weighting |                                      |                       |            |                     |                                                | 15                                                                                                                                  |                                                         | 10                                                                                                                                  |                                                                                                                                                                         | 15                                                                                                                                  |                                                                                                                                                                                                                                                                           | 10                                               |                                                                                                                                                                                                                                                                                                        | 19                                      | 17                                     | 7                                                                                                                                                                     | 7                                                                                                                                                    | 100                             |         |
| P-62               | North Pond- Markham<br>Study Area 1A | 1983                  | 2005       | Wet Pond            | Morningside<br>Creek                           | 0.00                                                                                                                                | Current design<br>provides adequate<br>quality control. | 0.50                                                                                                                                | Current design<br>provides 24 hr<br>detention of the<br>25mm storm event.<br>Increase in<br>detention time<br>recommended to<br>meet TRCA's 2012<br>draft SWM criteria. | 0.00                                                                                                                                | Quantity control provided is<br>adequate.                                                                                                                                                                                                                                 | 1.00                                             | MNR has<br>identified<br>downstream<br>receiving<br>watercourse<br>as Redside<br>Dace habitat.                                                                                                                                                                                                         | 0.50                                    | 1                                      | 0.50                                                                                                                                                                  | 0.00                                                                                                                                                 | 45                              | 14      |
| P-73               | East Cathedral Azuria<br>POND E2     | Data not<br>available | 2002       | Wet Pond            | Carlton<br>Creek                               | 0.00                                                                                                                                | Current design<br>provides adequate<br>quality control. | 0.00                                                                                                                                | Current design<br>provides adequate<br>erosion control.                                                                                                                 | 0.00                                                                                                                                | Quantity control provided in<br>combination with adjacent<br>pond is adequate.                                                                                                                                                                                            | 0.50                                             | MNR has<br>identified<br>downstream<br>receiving<br>watercourse<br>as <i>possibly</i><br>Redside Dace<br>habitat.                                                                                                                                                                                      | 1.00                                    | 1                                      | 0.50                                                                                                                                                                  | 0.00                                                                                                                                                 | 45                              | 15      |
| UCO-63w            |                                      |                       |            | Uncontrolled Outlet | Upper East<br>Don of Don<br>River<br>Watershed | 1.00                                                                                                                                | No quality control<br>provided.                         | 0.50                                                                                                                                | No erosion control<br>provided and is<br>required. However<br>only partial erosion<br>control can be<br>achieved without<br>loss of trees.                              | 0.00                                                                                                                                | No quantity control provided<br>and is required, however<br>construction of a quantity<br>control facility is not feasible<br>because there is not<br>adequate space for a<br>quantity control facility that<br>will control the relatively<br>large major drainage area. | 0.00                                             | MNR has<br>identified this<br>area is<br><i>unlikely</i> to be<br>outletting to<br>Redside Dace<br>habitat.                                                                                                                                                                                            | 0.00                                    | 1                                      | 1.00                                                                                                                                                                  | 0.00                                                                                                                                                 | 44                              | 16      |
| UCO-103            |                                      |                       |            | Uncontrolled Outlet | Bruce Creek<br>of Rouge<br>River<br>Watershed  | 1.00                                                                                                                                | No quality control<br>provided.                         | 0.00                                                                                                                                | No erosion control<br>provided and is<br>required but there is<br>not adequate space<br>available for an<br>erosion control<br>facility.                                | 0.00                                                                                                                                | No quantity control required<br>downstream of 16th Avenue<br>for Bruce Creek per draft<br>2012 TRCA SWM criteria.                                                                                                                                                         | 0.25                                             | MNR has<br>identified<br>downstream<br>receiving<br>watercourse<br>as <i>possibly</i><br>Redside Dace<br>habitat.<br>However,<br>minimal<br>warming of<br>stormwater<br>occurs when<br>surface<br>storage is not<br>occurring so<br>temperature is<br>not a<br>significant<br>concern at this<br>site. | 0.50                                    | 1                                      | 0.00                                                                                                                                                                  | 0.00                                                                                                                                                 | 44                              | 17      |

| Site ID            | Facility Name<br>(SWMSoft Database)         | Year Assumed | Year Built         | Facility Type                                              | Watershed                                                               | Quality Control Upgrade Required                                                                            | Technical Rational                                | Erosion Control Upgrade Required                                                                            | Technical Rational                                                                                                                                                                                                                                                                         | Quantity Control Upgrade Required                                                                           | Technical Rational                                                                                                                                                             | Temperature Mitigation Upgrade Required | Technical Rational                                                                        | Cost Order of Magnitude           | Property Acquisition Anticipated | ELC / SAR / ESA                                                                                                                                  | Archeological /Cultural                                                                                                            | Total Prioitization Score | Ranking |
|--------------------|---------------------------------------------|--------------|--------------------|------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|---------------------------------------------------|-------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|-------------------------------------------------------------------------------------------|-----------------------------------|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|---------------------------|---------|
|                    |                                             |              |                    |                                                            |                                                                         | Yes, no control currently provided = 1, Yes, some level of control currently provided = #>0 but #<1, No = 0 |                                                   | Yes, no control currently provided = 1, Yes, some level of control currently provided = #>0 but #<1, No = 0 |                                                                                                                                                                                                                                                                                            | Yes, no control currently provided = 1, Yes, some level of control currently provided = #>0 but #<1, No = 0 |                                                                                                                                                                                | Yes = 1, No = 0                         |                                                                                           | Low = 1, Moderate = 0.5, High = 0 | No = 1, Yes = 0                  | Less Valued ELC and no SAR / ESA = 1, Less Valued ELC and only Redside Dace present = 0.5, Valued ELC and/or ESA and/or multiple SAR present = 0 | No = 1, Either Archeological or Cultural Investigation Required = 0.5, Both Archaeological and Cultural Investigation Required = 0 | 100                       |         |
| Criteria Weighting |                                             |              |                    |                                                            |                                                                         | 15                                                                                                          |                                                   | 10                                                                                                          |                                                                                                                                                                                                                                                                                            | 15                                                                                                          |                                                                                                                                                                                | 10                                      |                                                                                           | 19                                | 17                               | 7                                                                                                                                                |                                                                                                                                    | 7                         |         |
| P-39               | Bridle Trail Phase 4 Pond                   | 1987         | 1986               | Dry Pond (as designed but currently has some ponded water) | Eckardt Creek (formerly Burdenet Creek) of the Lower Rouge Subwatershed | 1.00                                                                                                        | Not designed to provide quality control.          | 1.00                                                                                                        | The current pond was not designed to provided erosion control. Burdenet Creek has known erosion issues (as documented in the Jan 2010 Burdenet Creek Erosion Control Optimization Study by Aquafor Beech Ltd). However only partial erosion control can be acheived without loss of trees. | 0.00                                                                                                        | No quantity control required.                                                                                                                                                  | 0.00                                    | MNR has identified this area is <i>unlikely</i> to be outletting to Redside Dace habitat. | 0.10                              | 1                                | 0.00                                                                                                                                             | 0.00                                                                                                                               | 44                        | 18      |
| P-5                | Pond 2E - Buttonville Mdp                   | 1990         | 1990               | Wet Pond                                                   | Apple Creek of the Rouge River                                          | 0.00                                                                                                        | Current design provides adequate quality control. | 0.25                                                                                                        | The current pond was not designed to provided erosion control. Only a minor improvement can be achieved without loss of trees.                                                                                                                                                             | 0.00                                                                                                        | No quantity control required but is provided.                                                                                                                                  | 1.00                                    | MNR has identified downstream receiving watercourse as Redside Dace habitat.              | 0.50                              | 1                                | 0.50                                                                                                                                             | 0.00                                                                                                                               | 43                        | 19      |
| UCO-162            |                                             |              |                    | Uncontrolled Outlet                                        | Rouge River of the Lower Rouge Subwatershed                             | 1.00                                                                                                        | No quality control provided.                      | 0.75                                                                                                        | No erosion control provided and is required. However only partial erosion control can be achieved without loss of trees.                                                                                                                                                                   | 0.00                                                                                                        | No quantity control required.                                                                                                                                                  | 1.00                                    | MNR has identified downstream receiving watercourse as Redside Dace habitat.              | 0.50                              | 0                                | 0.00                                                                                                                                             | 0.00                                                                                                                               | 42                        | 20      |
| P-38               | Bridle Trail Phase 3 Pond                   | 2005         | 1985               | Dry Pond (as designed but currently has some ponded water) | Eckardt Creek (formerly Burdenet Creek) of the Lower Rouge Subwatershed | 1.00                                                                                                        | Not designed to provide quality control.          | 1.00                                                                                                        | The current pond was not designed to provided erosion control. Burdenet Creek has known erosion issues (as documented in the Jan 2010 Burdenet Creek Erosion Control Optimization Study by Aquafor Beech Ltd). However only partial erosion control can be acheived without loss of trees. | 0.00                                                                                                        | No quantity control required.                                                                                                                                                  | 0.00                                    | MNR has identified this area is <i>unlikely</i> to be outletting to Redside Dace habitat. | 0.00                              | 1                                | 0.00                                                                                                                                             | 0.00                                                                                                                               | 42                        | 21      |
| P-42               | Robinson Creek - Raymerville Community Pond | 1975         | Data not available | Wetland                                                    | Robinson Creek                                                          | 1.00                                                                                                        | No quality control provided.                      | 0.00                                                                                                        | No erosion control provided and is required. However providing erosion control is limited because the facility is onle and there is not adequate space to construct an offline facility.                                                                                                   | 0.00                                                                                                        | Quantity control provided (post to pre) up to 2 year design event. No quantity control required downstream of 16th Avenue for Robinson Creek per draft 2012 TRCA SWM criteria. | 1.00                                    | MNR has identified downstream receiving watercourse as Redside Dace habitat.              | 0.00                              | 1                                | 0.00                                                                                                                                             | 0.00                                                                                                                               | 42                        | 22      |



| Site ID            | Facility Name<br>(SWMSoft Database)        | Year Assumed       | Year Built | Facility Type                                                | Watershed                                | Quality Control Upgrade Required                                                                            | Technical Rational                                                                                                         | Erosion Control Upgrade Required                                                                            | Technical Rational                                                                                                                                                     | Quantity Control Upgrade Required                                                                           | Technical Rational                                                                                                                                           | Temperature Mitigation Upgrade Required | Technical Rational                                                                                                                                                                    | Cost Order of Magnitude           | Property Acquisition Anticipated | ELC / SAR / ESA                                                                                                                                  | Archeological /Cultural                                                                                                            | Total Prioitization Score | Ranking |
|--------------------|--------------------------------------------|--------------------|------------|--------------------------------------------------------------|------------------------------------------|-------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|---------------------------|---------|
|                    |                                            |                    |            |                                                              |                                          | Yes, no control currently provided = 1, Yes, some level of control currently provided = #>0 but #<1, No = 0 |                                                                                                                            | Yes, no control currently provided = 1, Yes, some level of control currently provided = #>0 but #<1, No = 0 |                                                                                                                                                                        | Yes, no control currently provided = 1, Yes, some level of control currently provided = #>0 but #<1, No = 0 |                                                                                                                                                              | Yes = 1, No = 0                         |                                                                                                                                                                                       | Low = 1, Moderate = 0.5, High = 0 | No = 1, Yes = 0                  | Less Valued ELC and no SAR / ESA = 1, Less Valued ELC and only Redside Dace present = 0.5, Valued ELC and/or ESA and/or multiple SAR present = 0 | No = 1, Either Archeological or Cultural Investigation Required = 0.5, Both Archaeological and Cultural Investigation Required = 0 |                           |         |
| Criteria Weighting |                                            |                    |            |                                                              |                                          | 15                                                                                                          |                                                                                                                            | 10                                                                                                          |                                                                                                                                                                        | 15                                                                                                          |                                                                                                                                                              | 10                                      |                                                                                                                                                                                       | 19                                | 17                               | 7                                                                                                                                                | 7                                                                                                                                  | 100                       |         |
| P-48               | Cachet Woods Phase 2 Pond                  | 1994               | 1994       | Wet Pond                                                     | Carlton Creek                            | 0.00                                                                                                        | Current design provides adequate quality control.                                                                          | 0.50                                                                                                        | Current design provides 24 hr detention of the 25mm storm event. Increase in detention time recommended to meet TRCA's 2012 draft SWM criteria.                        | 0.00                                                                                                        | The current design does not provide any quantity control and it is required but there is not adequate space available to provide quanity control.            | 1.00                                    | MNR has identified downstream receiving watercourse as Redside Dace habitat.                                                                                                          | 0.50                              | 1                                | 0.00                                                                                                                                             | 0.00                                                                                                                               | 42                        | 23      |
| P-53               | Tomlinson Pond - Minto Markham Partnership | Data not available | 1997       | Wet Pond                                                     | Rouge River                              | 0.00                                                                                                        | Current design provides adequate quality control.                                                                          | 0.50                                                                                                        | Current design provides 24 hr detention of the 25mm storm event. Increase in detention time recommended to meet TRCA's 2012 draft SWM criteria.                        | 0.00                                                                                                        | No quantity control required.                                                                                                                                | 0.50                                    | MNR has identified downstream receiving watercourse as <i>possibly</i> Redside Dace habitat.                                                                                          | 0.50                              | 1                                | 0.50                                                                                                                                             | 0.00                                                                                                                               | 40                        | 24      |
| P-1                | Pond 2A - Buttonville Mdp                  | 1987               | 2005       | Wetland                                                      | Apple Creek of the Rouge River Watershed | 0.00                                                                                                        | Current design provides adequate quality control.                                                                          | 0.25                                                                                                        | The current pond was not designed to provided erosion control.                                                                                                         | 0.00                                                                                                        | No quantity control required but is provided.                                                                                                                | 1.00                                    | MNR has identified downstream receiving watercourse as Redside Dace habitat.                                                                                                          | 0.50                              | 1                                | 0.00                                                                                                                                             | 0.00                                                                                                                               | 39                        | 25      |
| P-11               | Northeast Markham - Mt. Joy Pond           | Data not available | 1982       | Wet Pond                                                     | Exhibition Creek                         | 0.00                                                                                                        | Current design provides adequate quality control.                                                                          | 0.50                                                                                                        | No erosion control provided and is required. However there is no space for expansion so only a partial erosion control improvement may be possible.                    | 0.00                                                                                                        | Quantity control provided but none is required.                                                                                                              | 0.00                                    | MNR has identified this area is <i>unlikely</i> to be outletting to Redside Dace habitat.                                                                                             | 0.50                              | 1                                | 1.00                                                                                                                                             | 0.00                                                                                                                               | 39                        | 26      |
| P-111-A            | Not in SWMSoft database                    |                    | 1983       | Wet Pond (previsouly identified as Uncontrolled Outlet #105) | Berczy Creek of Rouge River Watershed    | 0.25                                                                                                        | Current pond has a permanent pool and so provides some quality control, however pond was not designed for quality control. | 0.50                                                                                                        | No erosion control provided and is required. However limited erosion control can be provided without expanding pond (expansion of pond would result in loss of trees). | 0.00                                                                                                        | Some level of quantity control required, however no quantity control required downstream of Warden Avenue for Berczy Creek per draft 2012 TRCA SWM criteria. | 0.25                                    | MNR has identified downstream receiving watercourse as Redside Dace habitat. Pon dand downstream watercourse are surrounded by heavy vegetation so some cooling is already occurring. | 0.50                              | 1                                | 0.00                                                                                                                                             | 0.00                                                                                                                               | 38                        | 27      |

| Site ID            | Facility Name<br>(SWMSof Database)        | Year Assumed       | Year Built | Facility Type       | Watershed                                | Quality Control Upgrade Required                                                                            | Technical Rational                                                                                                                                                                                                                        | Erosion Control Upgrade Required                                                                            | Technical Rational                                                                                                                                                            | Quantity Control Upgrade Required                                                                           | Technical Rational                                                                                                                | Temperature Mitigation Upgrade Required | Technical Rational                                                                                                                                                                                                                   | Cost Order of Magnitude           | Property Acquisition Anticipated | ELC / SAR / ESA                                                                                                                                  | Archeological /Cultural                                                                                                            | Total Prioitization Score | Ranking |
|--------------------|-------------------------------------------|--------------------|------------|---------------------|------------------------------------------|-------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|---------------------------|---------|
|                    |                                           |                    |            |                     |                                          | Yes, no control currently provided = 1, Yes, some level of control currently provided = #>0 but #<1, No = 0 |                                                                                                                                                                                                                                           | Yes, no control currently provided = 1, Yes, some level of control currently provided = #>0 but #<1, No = 0 |                                                                                                                                                                               | Yes, no control currently provided = 1, Yes, some level of control currently provided = #>0 but #<1, No = 0 |                                                                                                                                   | Yes = 1, No = 0                         |                                                                                                                                                                                                                                      | Low = 1, Moderate = 0.5, High = 0 | No = 1, Yes = 0                  | Less Valued ELC and no SAR / ESA = 1, Less Valued ELC and only Redside Dace present = 0.5, Valued ELC and/or ESA and/or multiple SAR present = 0 | No = 1, Either Archeological or Cultural Investigation Required = 0.5, Both Archaeological and Cultural Investigation Required = 0 | 100                       |         |
| Criteria Weighting |                                           |                    |            |                     |                                          | 15                                                                                                          |                                                                                                                                                                                                                                           | 10                                                                                                          |                                                                                                                                                                               | 15                                                                                                          |                                                                                                                                   | 10                                      |                                                                                                                                                                                                                                      | 19                                | 17                               | 7                                                                                                                                                | 7                                                                                                                                  |                           |         |
| P-4                | Pond 2D - Buttonville Mdp                 | 1991               | 1991       | Wet Pond            | Apple Creek of the Rouge River Watershed | 0.75                                                                                                        | Current design provides 2 m <sup>3</sup> /ha of permanent pool volume, however, 55 m3/ha is required to satisfy current MOE guidelines for Enhanced (Level 1) control. 1998 report recommended adding permanent pool to 2A to compensate. | 0.00                                                                                                        | The current pond was not designed to provided erosion control. However the drainage area has a long conveyance path providing extended detention of runoff within the system. | 0.00                                                                                                        | No quantity control required but is provided.                                                                                     | 0.00                                    | MNR has identified downstream receiving watercourse as Redside Dace habitat. However the pond and downstream watercourse is an open channel with vegetation cover so further measures would have minimal impact and are not needed . | 0.50                              | 1                                | 0.00                                                                                                                                             | 0.00                                                                                                                               | 38                        | 28      |
| P-8                | Markville Centre                          | 1980               | 1980       | Wet Pond            | Rouge River                              | 0.10                                                                                                        | Quality control provided is adequate but there is no formal forbay included in design to limit sediment transport through facility.                                                                                                       | 0.25                                                                                                        | There is not enough data is available to confirm if the current design provides erosion control. Also if the pond needs to be expanded it would result in a loss of trees.    | 0.00                                                                                                        | Quantity control not required.                                                                                                    | 0.00                                    | MNR has identified this area is <i>unlikely</i> to be outletting to Redside Dace habitat.                                                                                                                                            | 0.50                              | 1                                | 1.00                                                                                                                                             | 0.00                                                                                                                               | 38                        | 29      |
| P-52               | Old Mill Pond - Minto Markham Partnership | Data not available | 1997       | Wet Pond            | Rouge River                              | 0.00                                                                                                        | Current design provides adequate quality control.                                                                                                                                                                                         | 0.50                                                                                                        | Current design provides 24 hr detention of the 25mm storm event. Increase in detention time recommended to meet TRCA's 2012 draft SWM criteria.                               | 0.00                                                                                                        | No quantity control required.                                                                                                     | 0.50                                    | MNR has identified downstream receiving watercourse as <i>possibly</i> Redside Dace habitat.                                                                                                                                         | 0.50                              | 1                                | 0.00                                                                                                                                             | 0.00                                                                                                                               | 37                        | 30      |
| P-67               | Buttonville Business Park Pond 2G         | 1991               | 1991       | Wetland             | Applewood Creek                          | 0.50                                                                                                        | Current design provides 40 m <sup>3</sup> /ha of permanent pool volume, however, 100 m3/ha is required to satisfy current MOE guidelines for Enhanced (Level 1) control.                                                                  | 0.25                                                                                                        | Current design provides 24 hr detention of the 25mm storm event. Increase in detention time recommended to meet TRCA's 2012 draft SWM criteria.                               | 0.00                                                                                                        | No quantity control required.                                                                                                     | 1.00                                    | MNR has identified downstream receiving watercourse as Redside Dace habitat.                                                                                                                                                         | 0.50                              | 0                                | 0.50                                                                                                                                             | 0.00                                                                                                                               | 33                        | 31      |
| UCO-159            |                                           |                    |            | Uncontrolled Outlet | Rouge River                              | 1.00                                                                                                        | No quality control provided.                                                                                                                                                                                                              | 0.00                                                                                                        | No erosion control provided and is required. However there is no space available for construction of an erosion control facility.                                             | 0.00                                                                                                        | No quantity control provided and is required. However ther eis no space available for construction of a quality control facility. | 0.50                                    | MNR has identified downstream receiving watercourse as <i>possibly</i> Redside Dace habitat.                                                                                                                                         | 0.50                              | 0                                | 0.00                                                                                                                                             | 0.00                                                                                                                               | 30                        | 32      |

| Site ID            | Facility Name<br>(SWMSoft Database) | Year Assumed | Year Built         | Facility Type | Watershed          | Quality Control Upgrade Required                                                                            | Technical Rational                                                                            | Erosion Control Upgrade Required                                                                            | Technical Rational                                                                            | Quantity Control Upgrade Required                                                                           | Technical Rational                                               | Temperature Mitigation Upgrade Required | Technical Rational                                                                           | Cost Order of Magnitude           | Property Acquisition Anticipated | ELC / SAR / ESA                                                                                                                                  | Archeological /Cultural                                                                                                           |                           |         |
|--------------------|-------------------------------------|--------------|--------------------|---------------|--------------------|-------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|-----------------------------------------|----------------------------------------------------------------------------------------------|-----------------------------------|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|---------------------------|---------|
|                    |                                     |              |                    |               |                    | Yes, no control currently provided = 1, Yes, some level of control currently provided = #>0 but #<1, No = 0 |                                                                                               | Yes, no control currently provided = 1, Yes, some level of control currently provided = #>0 but #<1, No = 0 |                                                                                               | Yes, no control currently provided = 1, Yes, some level of control currently provided = #>0 but #<1, No = 0 |                                                                  | Yes = 1, No = 0                         |                                                                                              | Low = 1, Moderate = 0.5, High = 0 | No = 1, Yes = 0                  | Less Valued ELC and no SAR / ESA = 1, Less Valued ELC and only Redside Dace present = 0.5, Valued ELC and/or ESA and/or multiple SAR present = 0 | No = 1, Either Archeological or Cultural Investigation Required = 0.5, Both Archeological and Cultural Investigation Required = 0 | Total Prioitization Score | Ranking |
| Criteria Weighting |                                     |              |                    |               |                    | 15                                                                                                          |                                                                                               | 10                                                                                                          |                                                                                               | 15                                                                                                          |                                                                  | 10                                      |                                                                                              | 19                                | 17                               | 7                                                                                                                                                | 7                                                                                                                                 | 100                       |         |
| P-37               | Hagerman Estates Subd.              | 1988         | Data not available | Wetland       | Rouge River        | 0.25                                                                                                        | Quality control provided is unknown but potentially inadequate.                               | 0.25                                                                                                        | There is no data available to confirm if the current design provides erosion control.         | 0.00                                                                                                        | No quantity control required.                                    | 0.50                                    | MNR has identified downstream receiving watercourse as <i>possibly</i> Redside Dace habitat. | 0.50                              | 0                                | 0.50                                                                                                                                             | 0.00                                                                                                                              | 24                        | 33      |
| P-23               | Pond 4 - Thornlea East Community    | 1982         | 1982               | Dry Pond      | German Mills Creek | 0.00                                                                                                        | Only major events are directed to this facility, therefore quality control is not applicable. | 0.00                                                                                                        | Only major events are directed to this facility, therefore erosion control is not applicable. | 0.25                                                                                                        | Quantity control provided is unknown but potentially inadequate. | 0.00                                    | MNR has identified this area is <i>unlikely</i> to be outletting to Redside Dace habitat.    | 0.50                              | 0                                | 1.00                                                                                                                                             | 0.00                                                                                                                              | 20                        | 34      |



Pond 1

## Screening for Impacts to Built Heritage and Cultural Heritage Landscapes

This checklist is intended to help proponents determine whether their project could affect known or potential cultural heritage resources. The completed checklist should be returned to the appropriate Heritage Planner or Heritage Advisor at the Ministry of Tourism and Culture.

### Step 1 – Screening for Recognized Cultural Heritage Value

| YES                      | NO                       | Unknown                  |                                                                                                                                         |
|--------------------------|--------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Is the subject property designated or adjacent* to a property designated under the <i>Ontario Heritage Act</i> ?                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Is the subject property listed on the municipal heritage register or a provincial register/list? (e.g. Ontario Heritage Bridge List) |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the subject property within or adjacent to a Heritage Conservation District?                                                      |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. Does the subject property have an Ontario Heritage Trust easement or is it adjacent to such a property?                              |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Is there a provincial or federal plaque on or near the subject property?                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Is the subject property a National Historic Site?                                                                                    |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Is the subject property recognized or valued by an Aboriginal community?                                                             |

### Step 2 – Screening Potential Resources

| YES                      | NO                       | Unknown                  |                                                                                                                                                                                                                                                                                                                |
|--------------------------|--------------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <b>Built heritage resources</b>                                                                                                                                                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Does the subject property or an adjacent property contain any buildings or structures <b>over forty years old</b> <sup>†</sup> that are:                                                                                                                                                                    |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Residential structures (e.g. house, apartment building, shanty or trap line shelter)                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Farm buildings (e.g. barns, outbuildings, silos, windmills)                                                                                                                                                                                                                                                  |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Industrial, commercial or institutional buildings (e.g. a factory, school, etc.)                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Engineering works (e.g. bridges, water or communications towers, roads, water/sewer systems, dams, earthworks, etc.)                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Monuments or Landmark Features (e.g. cairns, statues, obelisks, fountains, reflecting pools, retaining walls, boundary or claim markers, etc.)                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Is the subject property or an adjacent property associated with a known architect or builder?                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the subject property or an adjacent property associated with a person or event of historic interest?                                                                                                                                                                                                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. When the municipal heritage planner was contacted regarding potential cultural heritage value of the subject property, did they express interest or concern?                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <b>Cultural heritage landscapes</b>                                                                                                                                                                                                                                                                            |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Does the subject property contain landscape features such as:                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Burial sites and/or cemeteries                                                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Parks or gardens                                                                                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Quarries, mining, industrial or farming operations                                                                                                                                                                                                                                                           |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Canals                                                                                                                                                                                                                                                                                                       |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Prominent natural features that could have special value to people (such as waterfalls, rocky outcrops, large specimen trees, caves, etc.)                                                                                                                                                                   |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Evidence of other human-made alterations to the natural landscape (such as trails, boundary or way-finding markers, mounds, earthworks, cultivation, non-native species, etc.)                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Is the subject property within a Canadian Heritage River watershed?                                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Is the subject property near the Rideau Canal Corridor UNESCO World Heritage Site?                                                                                                                                                                                                                          |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 8. Is there any evidence from documentary sources (e.g., local histories, a local recognition program, research studies, previous heritage impact assessment reports, etc.) or local knowledge or Aboriginal oral history, associating the subject property/ area with historic events, activities or persons? |

## Screening for Impacts to Built Heritage and Cultural Heritage Landscapes

This checklist is intended to help proponents determine whether their project could affect known or potential cultural heritage resources. The completed checklist should be returned to the appropriate Heritage Planner or Heritage Advisor at the Ministry of Tourism and Culture.

### Step 1 – Screening for Recognized Cultural Heritage Value

| YES                      | NO                                  | Unknown                             |                                                                                                                                         |
|--------------------------|-------------------------------------|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 1. Is the subject property designated or adjacent* to a property designated under the <i>Ontario Heritage Act</i> ?                     |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 2. Is the subject property listed on the municipal heritage register or a provincial register/list? (e.g. Ontario Heritage Bridge List) |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 3. Is the subject property within or adjacent to a Heritage Conservation District?                                                      |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 4. Does the subject property have an Ontario Heritage Trust easement or is it adjacent to such a property?                              |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 5. Is there a provincial or federal plaque on or near the subject property?                                                             |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 6. Is the subject property a National Historic Site?                                                                                    |
| <input type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | 7. Is the subject property recognized or valued by an Aboriginal community?                                                             |

### Step 2 – Screening Potential Resources

| YES                      | NO                                  | Unknown                             |                                                                                                                                                                                                                                                                                                                |
|--------------------------|-------------------------------------|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <b>Built heritage resources</b>                                                                                                                                                                                                                                                                                |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 1. Does the subject property or an adjacent property contain any buildings or structures <b>over forty years old</b> <sup>†</sup> that are:                                                                                                                                                                    |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Residential structures (e.g. house, apartment building, shanty or trap line shelter)                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Farm buildings (e.g. barns, outbuildings, silos, windmills)                                                                                                                                                                                                                                                  |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Industrial, commercial or institutional buildings (e.g. a factory, school, etc.)                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Engineering works (e.g. bridges, water or communications towers, roads, water/sewer systems, dams, earthworks, etc.)                                                                                                                                                                                         |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Monuments or Landmark Features (e.g. cairns, statues, obelisks, fountains, reflecting pools, retaining walls, boundary or claim markers, etc.)                                                                                                                                                               |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 2. Is the subject property or an adjacent property associated with a known architect or builder?                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 3. Is the subject property or an adjacent property associated with a person or event of historic interest?                                                                                                                                                                                                     |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 4. When the municipal heritage planner was contacted regarding potential cultural heritage value of the subject property, did they express interest or concern?                                                                                                                                                |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <b>Cultural heritage landscapes</b>                                                                                                                                                                                                                                                                            |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 5. Does the subject property contain landscape features such as:                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Burial sites and/or cemeteries                                                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Parks or gardens                                                                                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Quarries, mining, industrial or farming operations                                                                                                                                                                                                                                                           |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Canals                                                                                                                                                                                                                                                                                                       |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Prominent natural features that could have special value to people (such as waterfalls, rocky outcrops, large specimen trees, caves, etc.)                                                                                                                                                                   |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Evidence of other human-made alterations to the natural landscape (such as trails, boundary or way-finding markers, mounds, earthworks, cultivation, non-native species, etc.)                                                                                                                               |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 6. Is the subject property within a Canadian Heritage River watershed?                                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 7. Is the subject property near the Rideau Canal Corridor UNESCO World Heritage Site?                                                                                                                                                                                                                          |
| <input type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | 8. Is there any evidence from documentary sources (e.g., local histories, a local recognition program, research studies, previous heritage impact assessment reports, etc.) or local knowledge or Aboriginal oral history, associating the subject property/ area with historic events, activities or persons? |



## Screening for Impacts to Built Heritage and Cultural Heritage Landscapes

This checklist is intended to help proponents determine whether their project could affect known or potential cultural heritage resources. The completed checklist should be returned to the appropriate Heritage Planner or Heritage Advisor at the Ministry of Tourism and Culture.

### Step 1 – Screening for Recognized Cultural Heritage Value

| YES                      | NO                       | Unknown                  |                                                                                                                                         |
|--------------------------|--------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Is the subject property designated or adjacent* to a property designated under the <i>Ontario Heritage Act</i> ?                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Is the subject property listed on the municipal heritage register or a provincial register/list? (e.g. Ontario Heritage Bridge List) |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the subject property within or adjacent to a Heritage Conservation District?                                                      |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. Does the subject property have an Ontario Heritage Trust easement or is it adjacent to such a property?                              |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Is there a provincial or federal plaque on or near the subject property?                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Is the subject property a National Historic Site?                                                                                    |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Is the subject property recognized or valued by an Aboriginal community?                                                             |

### Step 2 – Screening Potential Resources

| YES                      | NO                       | Unknown                  |                                                                                                                                                                                                                                                                                                                |
|--------------------------|--------------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <b>Built heritage resources</b>                                                                                                                                                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Does the subject property or an adjacent property contain any buildings or structures <b>over forty years old</b> <sup>†</sup> that are:                                                                                                                                                                    |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Residential structures (e.g. house, apartment building, shanty or trap line shelter)                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Farm buildings (e.g. barns, outbuildings, silos, windmills)                                                                                                                                                                                                                                                  |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Industrial, commercial or institutional buildings (e.g. a factory, school, etc.)                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Engineering works (e.g. bridges, water or communications towers, roads, water/sewer systems, dams, earthworks, etc.)                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Monuments or Landmark Features (e.g. cairns, statues, obelisks, fountains, reflecting pools, retaining walls, boundary or claim markers, etc.)                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Is the subject property or an adjacent property associated with a known architect or builder?                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the subject property or an adjacent property associated with a person or event of historic interest?                                                                                                                                                                                                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. When the municipal heritage planner was contacted regarding potential cultural heritage value of the subject property, did they express interest or concern?                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <b>Cultural heritage landscapes</b>                                                                                                                                                                                                                                                                            |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Does the subject property contain landscape features such as:                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Burial sites and/or cemeteries                                                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Parks or gardens                                                                                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Quarries, mining, industrial or farming operations                                                                                                                                                                                                                                                           |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Canals                                                                                                                                                                                                                                                                                                       |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Prominent natural features that could have special value to people (such as waterfalls, rocky outcrops, large specimen trees, caves, etc.)                                                                                                                                                                   |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Evidence of other human-made alterations to the natural landscape (such as trails, boundary or way-finding markers, mounds, earthworks, cultivation, non-native species, etc.)                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Is the subject property within a Canadian Heritage River watershed?                                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Is the subject property near the Rideau Canal Corridor UNESCO World Heritage Site?                                                                                                                                                                                                                          |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 8. Is there any evidence from documentary sources (e.g., local histories, a local recognition program, research studies, previous heritage impact assessment reports, etc.) or local knowledge or Aboriginal oral history, associating the subject property/ area with historic events, activities or persons? |



## Screening for Impacts to Built Heritage and Cultural Heritage Landscapes

This checklist is intended to help proponents determine whether their project could affect known or potential cultural heritage resources. The completed checklist should be returned to the appropriate Heritage Planner or Heritage Advisor at the Ministry of Tourism and Culture.

### Step 1 – Screening for Recognized Cultural Heritage Value

| YES                      | NO                       | Unknown                  |                                                                                                                                         |
|--------------------------|--------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Is the subject property designated or adjacent* to a property designated under the <i>Ontario Heritage Act</i> ?                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Is the subject property listed on the municipal heritage register or a provincial register/list? (e.g. Ontario Heritage Bridge List) |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the subject property within or adjacent to a Heritage Conservation District?                                                      |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. Does the subject property have an Ontario Heritage Trust easement or is it adjacent to such a property?                              |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Is there a provincial or federal plaque on or near the subject property?                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Is the subject property a National Historic Site?                                                                                    |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Is the subject property recognized or valued by an Aboriginal community?                                                             |

### Step 2 – Screening Potential Resources

| YES                      | NO                       | Unknown                  |                                                                                                                                                                                                                                                                                                                |
|--------------------------|--------------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <b>Built heritage resources</b>                                                                                                                                                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Does the subject property or an adjacent property contain any buildings or structures <b>over forty years old<sup>†</sup></b> that are:                                                                                                                                                                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Residential structures (e.g. house, apartment building, shanty or trap line shelter)                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Farm buildings (e.g. barns, outbuildings, silos, windmills)                                                                                                                                                                                                                                                  |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Industrial, commercial or institutional buildings (e.g. a factory, school, etc.)                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Engineering works (e.g. bridges, water or communications towers, roads, water/sewer systems, dams, earthworks, etc.)                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Monuments or Landmark Features (e.g. cairns, statues, obelisks, fountains, reflecting pools, retaining walls, boundary or claim markers, etc.)                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Is the subject property or an adjacent property associated with a known architect or builder?                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the subject property or an adjacent property associated with a person or event of historic interest?                                                                                                                                                                                                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. When the municipal heritage planner was contacted regarding potential cultural heritage value of the subject property, did they express interest or concern?                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <b>Cultural heritage landscapes</b>                                                                                                                                                                                                                                                                            |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Does the subject property contain landscape features such as:                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Burial sites and/or cemeteries                                                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Parks or gardens                                                                                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Quarries, mining, industrial or farming operations                                                                                                                                                                                                                                                           |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Canals                                                                                                                                                                                                                                                                                                       |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Prominent natural features that could have special value to people (such as waterfalls, rocky outcrops, large specimen trees, caves, etc.)                                                                                                                                                                   |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Evidence of other human-made alterations to the natural landscape (such as trails, boundary or way-finding markers, mounds, earthworks, cultivation, non-native species, etc.)                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Is the subject property within a Canadian Heritage River watershed?                                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Is the subject property near the Rideau Canal Corridor UNESCO World Heritage Site?                                                                                                                                                                                                                          |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 8. Is there any evidence from documentary sources (e.g., local histories, a local recognition program, research studies, previous heritage impact assessment reports, etc.) or local knowledge or Aboriginal oral history, associating the subject property/ area with historic events, activities or persons? |

## Screening for Impacts to Built Heritage and Cultural Heritage Landscapes

This checklist is intended to help proponents determine whether their project could affect known or potential cultural heritage resources. The completed checklist should be returned to the appropriate Heritage Planner or Heritage Advisor at the Ministry of Tourism and Culture.

### Step 1 – Screening for Recognized Cultural Heritage Value

| YES                      | NO                       | Unknown                  |                                                                                                                                         |
|--------------------------|--------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Is the subject property designated or adjacent* to a property designated under the <i>Ontario Heritage Act</i> ?                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Is the subject property listed on the municipal heritage register or a provincial register/list? (e.g. Ontario Heritage Bridge List) |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the subject property within or adjacent to a Heritage Conservation District?                                                      |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. Does the subject property have an Ontario Heritage Trust easement or is it adjacent to such a property?                              |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Is there a provincial or federal plaque on or near the subject property?                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Is the subject property a National Historic Site?                                                                                    |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Is the subject property recognized or valued by an Aboriginal community?                                                             |

### Step 2 – Screening Potential Resources

| YES                      | NO                       | Unknown                  |                                                                                                                                                                                                                                                                                                                |
|--------------------------|--------------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <b>Built heritage resources</b>                                                                                                                                                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Does the subject property or an adjacent property contain any buildings or structures <b>over forty years old*</b> that are:                                                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Residential structures (e.g. house, apartment building, shanty or trap line shelter)                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Farm buildings (e.g. barns, outbuildings, silos, windmills)                                                                                                                                                                                                                                                  |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Industrial, commercial or institutional buildings (e.g. a factory, school, etc.)                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Engineering works (e.g. bridges, water or communications towers, roads, water/sewer systems, dams, earthworks, etc.)                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Monuments or Landmark Features (e.g. cairns, statues, obelisks, fountains, reflecting pools, retaining walls, boundary or claim markers, etc.)                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Is the subject property or an adjacent property associated with a known architect or builder?                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the subject property or an adjacent property associated with a person or event of historic interest?                                                                                                                                                                                                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. When the municipal heritage planner was contacted regarding potential cultural heritage value of the subject property, did they express interest or concern?                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <b>Cultural heritage landscapes</b>                                                                                                                                                                                                                                                                            |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Does the subject property contain landscape features such as:                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Burial sites and/or cemeteries                                                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Parks or gardens                                                                                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Quarries, mining, industrial or farming operations                                                                                                                                                                                                                                                           |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Canals                                                                                                                                                                                                                                                                                                       |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Prominent natural features that could have special value to people (such as waterfalls, rocky outcrops, large specimen trees, caves, etc.)                                                                                                                                                                   |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Evidence of other human-made alterations to the natural landscape (such as trails, boundary or way-finding markers, mounds, earthworks, cultivation, non-native species, etc.)                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Is the subject property within a Canadian Heritage River watershed?                                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Is the subject property near the Rideau Canal Corridor UNESCO World Heritage Site?                                                                                                                                                                                                                          |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 8. Is there any evidence from documentary sources (e.g., local histories, a local recognition program, research studies, previous heritage impact assessment reports, etc.) or local knowledge or Aboriginal oral history, associating the subject property/ area with historic events, activities or persons? |

## Screening for Impacts to Built Heritage and Cultural Heritage Landscapes

This checklist is intended to help proponents determine whether their project could affect known or potential cultural heritage resources. The completed checklist should be returned to the appropriate Heritage Planner or Heritage Advisor at the Ministry of Tourism and Culture.

### Step 1 – Screening for Recognized Cultural Heritage Value

| YES                      | NO                                  | Unknown                             |                                                                                                                                         |
|--------------------------|-------------------------------------|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 1. Is the subject property designated or adjacent* to a property designated under the <i>Ontario Heritage Act</i> ?                     |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 2. Is the subject property listed on the municipal heritage register or a provincial register/list? (e.g. Ontario Heritage Bridge List) |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 3. Is the subject property within or adjacent to a Heritage Conservation District?                                                      |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 4. Does the subject property have an Ontario Heritage Trust easement or is it adjacent to such a property?                              |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 5. Is there a provincial or federal plaque on or near the subject property?                                                             |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 6. Is the subject property a National Historic Site?                                                                                    |
| <input type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | 7. Is the subject property recognized or valued by an Aboriginal community?                                                             |

### Step 2 – Screening Potential Resources

| YES                      | NO                                  | Unknown                             |                                                                                                                                                                                                                                                                                                                |
|--------------------------|-------------------------------------|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <b>Built heritage resources</b>                                                                                                                                                                                                                                                                                |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 1. Does the subject property or an adjacent property contain any buildings or structures <b>over forty years old</b> <sup>†</sup> that are:                                                                                                                                                                    |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Residential structures (e.g. house, apartment building, shanty or trap line shelter)                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Farm buildings (e.g. barns, outbuildings, silos, windmills)                                                                                                                                                                                                                                                  |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Industrial, commercial or institutional buildings (e.g. a factory, school, etc.)                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Engineering works (e.g. bridges, water or communications towers, roads, water/sewer systems, dams, earthworks, etc.)                                                                                                                                                                                         |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Monuments or Landmark Features (e.g. cairns, statues, obelisks, fountains, reflecting pools, retaining walls, boundary or claim markers, etc.)                                                                                                                                                               |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 2. Is the subject property or an adjacent property associated with a known architect or builder?                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 3. Is the subject property or an adjacent property associated with a person or event of historic interest?                                                                                                                                                                                                     |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 4. When the municipal heritage planner was contacted regarding potential cultural heritage value of the subject property, did they express interest or concern?                                                                                                                                                |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <b>Cultural heritage landscapes</b>                                                                                                                                                                                                                                                                            |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 5. Does the subject property contain landscape features such as:                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Burial sites and/or cemeteries                                                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Parks or gardens                                                                                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Quarries, mining, industrial or farming operations                                                                                                                                                                                                                                                           |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Canals                                                                                                                                                                                                                                                                                                       |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Prominent natural features that could have special value to people (such as waterfalls, rocky outcrops, large specimen trees, caves, etc.)                                                                                                                                                                   |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Evidence of other human-made alterations to the natural landscape (such as trails, boundary or way-finding markers, mounds, earthworks, cultivation, non-native species, etc.)                                                                                                                               |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 6. Is the subject property within a Canadian Heritage River watershed?                                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 7. Is the subject property near the Rideau Canal Corridor UNESCO World Heritage Site?                                                                                                                                                                                                                          |
| <input type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | 8. Is there any evidence from documentary sources (e.g., local histories, a local recognition program, research studies, previous heritage impact assessment reports, etc.) or local knowledge or Aboriginal oral history, associating the subject property/ area with historic events, activities or persons? |



## Screening for Impacts to Built Heritage and Cultural Heritage Landscapes

This checklist is intended to help proponents determine whether their project could affect known or potential cultural heritage resources. The completed checklist should be returned to the appropriate Heritage Planner or Heritage Advisor at the Ministry of Tourism and Culture.

### Step 1 – Screening for Recognized Cultural Heritage Value

| YES                      | NO                       | Unknown                  |                                                                                                                                         |
|--------------------------|--------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Is the subject property designated or adjacent* to a property designated under the <i>Ontario Heritage Act</i> ?                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Is the subject property listed on the municipal heritage register or a provincial register/list? (e.g. Ontario Heritage Bridge List) |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the subject property within or adjacent to a Heritage Conservation District?                                                      |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. Does the subject property have an Ontario Heritage Trust easement or is it adjacent to such a property?                              |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Is there a provincial or federal plaque on or near the subject property?                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Is the subject property a National Historic Site?                                                                                    |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Is the subject property recognized or valued by an Aboriginal community?                                                             |

### Step 2 – Screening Potential Resources

| YES                      | NO                       | Unknown                  |                                                                                                                                                                                                                                                                                                                |
|--------------------------|--------------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <b>Built heritage resources</b>                                                                                                                                                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Does the subject property or an adjacent property contain any buildings or structures <b>over forty years old</b> that are:                                                                                                                                                                                 |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Residential structures (e.g. house, apartment building, shanty or trap line shelter)                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Farm buildings (e.g. barns, outbuildings, silos, windmills)                                                                                                                                                                                                                                                  |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Industrial, commercial or institutional buildings (e.g. a factory, school, etc.)                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Engineering works (e.g. bridges, water or communications towers, roads, water/sewer systems, dams, earthworks, etc.)                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Monuments or Landmark Features (e.g. cairns, statues, obelisks, fountains, reflecting pools, retaining walls, boundary or claim markers, etc.)                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Is the subject property or an adjacent property associated with a known architect or builder?                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the subject property or an adjacent property associated with a person or event of historic interest?                                                                                                                                                                                                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. When the municipal heritage planner was contacted regarding potential cultural heritage value of the subject property, did they express interest or concern?                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <b>Cultural heritage landscapes</b>                                                                                                                                                                                                                                                                            |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Does the subject property contain landscape features such as:                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Burial sites and/or cemeteries                                                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Parks or gardens                                                                                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Quarries, mining, industrial or farming operations                                                                                                                                                                                                                                                           |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Canals                                                                                                                                                                                                                                                                                                       |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Prominent natural features that could have special value to people (such as waterfalls, rocky outcrops, large specimen trees, caves, etc.)                                                                                                                                                                   |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Evidence of other human-made alterations to the natural landscape (such as trails, boundary or way-finding markers, mounds, earthworks, cultivation, non-native species, etc.)                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Is the subject property within a Canadian Heritage River watershed?                                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Is the subject property near the Rideau Canal Corridor UNESCO World Heritage Site?                                                                                                                                                                                                                          |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 8. Is there any evidence from documentary sources (e.g., local histories, a local recognition program, research studies, previous heritage impact assessment reports, etc.) or local knowledge or Aboriginal oral history, associating the subject property/ area with historic events, activities or persons? |

## Screening for Impacts to Built Heritage and Cultural Heritage Landscapes

This checklist is intended to help proponents determine whether their project could affect known or potential cultural heritage resources. The completed checklist should be returned to the appropriate Heritage Planner or Heritage Advisor at the Ministry of Tourism and Culture.

### Step 1 – Screening for Recognized Cultural Heritage Value

| YES                      | NO                       | Unknown                  |                                                                                                                                         |
|--------------------------|--------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Is the subject property designated or adjacent* to a property designated under the <i>Ontario Heritage Act</i> ?                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Is the subject property listed on the municipal heritage register or a provincial register/list? (e.g. Ontario Heritage Bridge List) |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the subject property within or adjacent to a Heritage Conservation District?                                                      |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. Does the subject property have an Ontario Heritage Trust easement or is it adjacent to such a property?                              |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Is there a provincial or federal plaque on or near the subject property?                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Is the subject property a National Historic Site?                                                                                    |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Is the subject property recognized or valued by an Aboriginal community?                                                             |

### Step 2 – Screening Potential Resources

| YES                      | NO                       | Unknown                  |                                                                                                                                                                                                                                                                                                                |
|--------------------------|--------------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <b>Built heritage resources</b>                                                                                                                                                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Does the subject property or an adjacent property contain any buildings or structures <b>over forty years old</b> <sup>†</sup> that are:                                                                                                                                                                    |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Residential structures (e.g. house, apartment building, shanty or trap line shelter)                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Farm buildings (e.g. barns, outbuildings, silos, windmills)                                                                                                                                                                                                                                                  |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Industrial, commercial or institutional buildings (e.g. a factory, school, etc.)                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Engineering works (e.g. bridges, water or communications towers, roads, water/sewer systems, dams, earthworks, etc.)                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Monuments or Landmark Features (e.g. cairns, statues, obelisks, fountains, reflecting pools, retaining walls, boundary or claim markers, etc.)                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Is the subject property or an adjacent property associated with a known architect or builder?                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the subject property or an adjacent property associated with a person or event of historic interest?                                                                                                                                                                                                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. When the municipal heritage planner was contacted regarding potential cultural heritage value of the subject property, did they express interest or concern?                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <b>Cultural heritage landscapes</b>                                                                                                                                                                                                                                                                            |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Does the subject property contain landscape features such as:                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Burial sites and/or cemeteries                                                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Parks or gardens                                                                                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Quarries, mining, industrial or farming operations                                                                                                                                                                                                                                                           |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Canals                                                                                                                                                                                                                                                                                                       |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Prominent natural features that could have special value to people (such as waterfalls, rocky outcrops, large specimen trees, caves, etc.)                                                                                                                                                                   |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Evidence of other human-made alterations to the natural landscape (such as trails, boundary or way-finding markers, mounds, earthworks, cultivation, non-native species, etc.)                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Is the subject property within a Canadian Heritage River watershed?                                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Is the subject property near the Rideau Canal Corridor UNESCO World Heritage Site?                                                                                                                                                                                                                          |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 8. Is there any evidence from documentary sources (e.g., local histories, a local recognition program, research studies, previous heritage impact assessment reports, etc.) or local knowledge or Aboriginal oral history, associating the subject property/ area with historic events, activities or persons? |

## Screening for Impacts to Built Heritage and Cultural Heritage Landscapes

This checklist is intended to help proponents determine whether their project could affect known or potential cultural heritage resources. The completed checklist should be returned to the appropriate Heritage Planner or Heritage Advisor at the Ministry of Tourism and Culture.

### Step 1 – Screening for Recognized Cultural Heritage Value

| YES                      | NO                       | Unknown                  |                                                                                                                                         |
|--------------------------|--------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Is the subject property designated or adjacent* to a property designated under the <i>Ontario Heritage Act</i> ?                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Is the subject property listed on the municipal heritage register or a provincial register/list? (e.g. Ontario Heritage Bridge List) |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the subject property within or adjacent to a Heritage Conservation District?                                                      |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. Does the subject property have an Ontario Heritage Trust easement or is it adjacent to such a property?                              |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Is there a provincial or federal plaque on or near the subject property?                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Is the subject property a National Historic Site?                                                                                    |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Is the subject property recognized or valued by an Aboriginal community?                                                             |

### Step 2 – Screening Potential Resources

| YES                      | NO                       | Unknown                  |                                                                                                                                                                                                                                                                                                                |
|--------------------------|--------------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <b>Built heritage resources</b>                                                                                                                                                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Does the subject property or an adjacent property contain any buildings or structures <b>over forty years old<sup>†</sup></b> that are:                                                                                                                                                                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Residential structures (e.g. house, apartment building, shanty or trap line shelter)                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Farm buildings (e.g. barns, outbuildings, silos, windmills)                                                                                                                                                                                                                                                  |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Industrial, commercial or institutional buildings (e.g. a factory, school, etc.)                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Engineering works (e.g. bridges, water or communications towers, roads, water/sewer systems, dams, earthworks, etc.)                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Monuments or Landmark Features (e.g. cairns, statues, obelisks, fountains, reflecting pools, retaining walls, boundary or claim markers, etc.)                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Is the subject property or an adjacent property associated with a known architect or builder?                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the subject property or an adjacent property associated with a person or event of historic interest?                                                                                                                                                                                                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. When the municipal heritage planner was contacted regarding potential cultural heritage value of the subject property, did they express interest or concern?                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <b>Cultural heritage landscapes</b>                                                                                                                                                                                                                                                                            |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Does the subject property contain landscape features such as:                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Burial sites and/or cemeteries                                                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Parks or gardens                                                                                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Quarries, mining, industrial or farming operations                                                                                                                                                                                                                                                           |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Canals                                                                                                                                                                                                                                                                                                       |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Prominent natural features that could have special value to people (such as waterfalls, rocky outcrops, large specimen trees, caves, etc.)                                                                                                                                                                   |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Evidence of other human-made alterations to the natural landscape (such as trails, boundary or way-finding markers, mounds, earthworks, cultivation, non-native species, etc.)                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Is the subject property within a Canadian Heritage River watershed?                                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Is the subject property near the Rideau Canal Corridor UNESCO World Heritage Site?                                                                                                                                                                                                                          |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 8. Is there any evidence from documentary sources (e.g., local histories, a local recognition program, research studies, previous heritage impact assessment reports, etc.) or local knowledge or Aboriginal oral history, associating the subject property/ area with historic events, activities or persons? |



## Screening for Impacts to Built Heritage and Cultural Heritage Landscapes

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### Step 1 – Screening for Recognized Cultural Heritage Value

| YES                      | NO                       | Unknown                  |                                                                                                                                         |
|--------------------------|--------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Is the subject property designated or adjacent* to a property designated under the <i>Ontario Heritage Act</i> ?                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Is the subject property listed on the municipal heritage register or a provincial register/list? (e.g. Ontario Heritage Bridge List) |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the subject property within or adjacent to a Heritage Conservation District?                                                      |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. Does the subject property have an Ontario Heritage Trust easement or is it adjacent to such a property?                              |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Is there a provincial or federal plaque on or near the subject property?                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Is the subject property a National Historic Site?                                                                                    |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Is the subject property recognized or valued by an Aboriginal community?                                                             |

### Step 2 – Screening Potential Resources

| YES                      | NO                       | Unknown                  |                                                                                                                                                                                                                                                                                                                |
|--------------------------|--------------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <b>Built heritage resources</b>                                                                                                                                                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Does the subject property or an adjacent property contain any buildings or structures <b>over forty years old</b> <sup>†</sup> that are:                                                                                                                                                                    |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Residential structures (e.g. house, apartment building, shanty or trap line shelter)                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Farm buildings (e.g. barns, outbuildings, silos, windmills)                                                                                                                                                                                                                                                  |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Industrial, commercial or institutional buildings (e.g. a factory, school, etc.)                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Engineering works (e.g. bridges, water or communications towers, roads, water/sewer systems, dams, earthworks, etc.)                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Monuments or Landmark Features (e.g. cairns, statues, obelisks, fountains, reflecting pools, retaining walls, boundary or claim markers, etc.)                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Is the subject property or an adjacent property associated with a known architect or builder?                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the subject property or an adjacent property associated with a person or event of historic interest?                                                                                                                                                                                                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. When the municipal heritage planner was contacted regarding potential cultural heritage value of the subject property, did they express interest or concern?                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <b>Cultural heritage landscapes</b>                                                                                                                                                                                                                                                                            |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Does the subject property contain landscape features such as:                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Burial sites and/or cemeteries                                                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Parks or gardens                                                                                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Quarries, mining, industrial or farming operations                                                                                                                                                                                                                                                           |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Canals                                                                                                                                                                                                                                                                                                       |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Prominent natural features that could have special value to people (such as waterfalls, rocky outcrops, large specimen trees, caves, etc.)                                                                                                                                                                   |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Evidence of other human-made alterations to the natural landscape (such as trails, boundary or way-finding markers, mounds, earthworks, cultivation, non-native species, etc.)                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Is the subject property within a Canadian Heritage River watershed?                                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Is the subject property near the Rideau Canal Corridor UNESCO World Heritage Site?                                                                                                                                                                                                                          |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 8. Is there any evidence from documentary sources (e.g., local histories, a local recognition program, research studies, previous heritage impact assessment reports, etc.) or local knowledge or Aboriginal oral history, associating the subject property/ area with historic events, activities or persons? |

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**Note:**

If the answer is "yes" to any question in Step 1, proceed to Step 3.

The following resources can assist in answering questions in Step 1:

**Municipal Clerk or Planning Department** – Information on properties designated under the Ontario Heritage Act (individual properties or Heritage Conservation Districts) and properties listed on a Municipal Heritage register.

**Ontario Heritage Trust** – Contact the OHT directly regarding easement properties. A list of OHT plaques can be found on the website: [Ontario Heritage Trust](http://OntarioHeritageTrust.com)

**Parks Canada** – A list of National Historic Sites can be found on the website: [Parks Canada](http://ParksCanada.gc.ca)

**Ministry of Tourism and Culture** – The Ontario Heritage Properties Database includes close to 8000 identified heritage properties. Note while this database is a valuable resource, it has not been updated since 2005, and therefore is not comprehensive or exhaustive. [Ontario Heritage Properties Database](http://OntarioHeritagePropertiesDatabase.com)

**Local or Provincial archives**

**Local heritage organizations**, such as the municipal heritage committee, historical society, local branch of the Architectural Conservancy of Ontario, etc.

Consideration should also be given to obtaining oral evidence of CHRs. For example, in many Aboriginal communities, an important means of maintaining knowledge of cultural heritage resources is through oral tradition.

If the answer is "yes" to any question in Step 2, an evaluation of cultural heritage value is required. If cultural heritage resources are identified, proceed to Step 3.

If the answer to any question in Step 1 or to questions 2-4, 6-8 in Step 2, is "unknown", further research is required.

If the answer is "yes" to any of the questions in Step 3, a heritage impact assessment is required.

If uncertainty exists at any point, the services of a qualified person should be retained to assist in completing this checklist. All cultural heritage evaluation reports and heritage impact assessment reports must be prepared by a qualified person. Qualified persons means individuals (professional engineers, architects, archaeologists, etc.) having relevant, recent experience in the identification and conservation of cultural heritage resources. Appropriate evaluation involves gathering and recording information about the property sufficient to understand and substantiate its heritage value; determining cultural heritage value or interest based on the advice of qualified persons and with appropriate community input. If the property meets the criteria in Ontario Regulation 9/06 under the Ontario Heritage Act, it is a cultural heritage resource.

† The 40 year old threshold is an indicator of potential when conducting a preliminary survey for identification of cultural heritage resources. While the presence of a built feature that is 40 or more years old does not automatically signify cultural heritage value, it does make it more likely that the property could have cultural heritage value or interest. Similarly, if all the built features on a property are less than 40 years old, this does not automatically mean the property has no cultural heritage value. Note that age is not a criterion for designation under the Ontario Heritage Act.

### Step 3 – Screening for Potential Impacts

| YES                                 | NO                                  | Will the proposed undertaking/project involve or result in any of the following potential impacts to the subject property or an adjacent* property?                             |
|-------------------------------------|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Destruction, removal or relocation</b> of any, or part of any, heritage attribute or feature.                                                                                |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <b>Alteration</b> (which means a change in any manner and includes restoration, renovation, repair or disturbance).                                                             |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Shadows</b> created that alter the appearance of a heritage attribute or change the exposure or visibility of a natural feature or plantings, such as a garden.              |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Isolation</b> of a heritage attribute from its surrounding environment, context or a significant relationship.                                                               |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Direct or indirect obstruction</b> of significant views or vistas from, within, or to a built or natural heritage feature.                                                   |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>A change in land use</b> such as rezoning a battlefield from open space to residential use, allowing new development or site alteration to fill in the formerly open spaces. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <b>Soil disturbance</b> such as a change in grade, or an alteration of the drainage pattern, or excavation, etc.                                                                |

\* For the purposes of evaluating potential impacts of development and site alteration "adjacent" means: contiguous properties as well as properties that are separated from a heritage property by narrow strip of land used as a public or private road, highway, street, lane, trail, right-of-way, walkway, green space, park, and/or easement or as otherwise defined in the municipal official plan.



## Screening for Impacts to Built Heritage and Cultural Heritage Landscapes

This checklist is intended to help proponents determine whether their project could affect known or potential cultural heritage resources. The completed checklist should be returned to the appropriate Heritage Planner or Heritage Advisor at the Ministry of Tourism and Culture.

### Step 1 – Screening for Recognized Cultural Heritage Value

| YES                      | NO                       | Unknown                  |                                                                                                                                         |
|--------------------------|--------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Is the subject property designated or adjacent* to a property designated under the <i>Ontario Heritage Act</i> ?                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Is the subject property listed on the municipal heritage register or a provincial register/list? (e.g. Ontario Heritage Bridge List) |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the subject property within or adjacent to a Heritage Conservation District?                                                      |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. Does the subject property have an Ontario Heritage Trust easement or is it adjacent to such a property?                              |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Is there a provincial or federal plaque on or near the subject property?                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Is the subject property a National Historic Site?                                                                                    |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Is the subject property recognized or valued by an Aboriginal community?                                                             |

### Step 2 – Screening Potential Resources

| YES                      | NO                       | Unknown                  |                                                                                                                                                                                                                                                                                                                |
|--------------------------|--------------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <b>Built heritage resources</b>                                                                                                                                                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Does the subject property or an adjacent property contain any buildings or structures <b>over forty years old</b> † that are:                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Residential structures (e.g. house, apartment building, shanty or trap line shelter)                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Farm buildings (e.g. barns, outbuildings, silos, windmills)                                                                                                                                                                                                                                                  |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Industrial, commercial or institutional buildings (e.g. a factory, school, etc.)                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Engineering works (e.g. bridges, water or communications towers, roads, water/sewer systems, dams, earthworks, etc.)                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Monuments or Landmark Features (e.g. cairns, statues, obelisks, fountains, reflecting pools, retaining walls, boundary or claim markers, etc.)                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Is the subject property or an adjacent property associated with a known architect or builder?                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the subject property or an adjacent property associated with a person or event of historic interest?                                                                                                                                                                                                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. When the municipal heritage planner was contacted regarding potential cultural heritage value of the subject property, did they express interest or concern?                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <b>Cultural heritage landscapes</b>                                                                                                                                                                                                                                                                            |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Does the subject property contain landscape features such as:                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Burial sites and/or cemeteries                                                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Parks or gardens                                                                                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Quarries, mining, industrial or farming operations                                                                                                                                                                                                                                                           |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Canals                                                                                                                                                                                                                                                                                                       |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Prominent natural features that could have special value to people (such as waterfalls, rocky outcrops, large specimen trees, caves, etc.)                                                                                                                                                                   |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Evidence of other human-made alterations to the natural landscape (such as trails, boundary or way-finding markers, mounds, earthworks, cultivation, non-native species, etc.)                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Is the subject property within a Canadian Heritage River watershed?                                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Is the subject property near the Rideau Canal Corridor UNESCO World Heritage Site?                                                                                                                                                                                                                          |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 8. Is there any evidence from documentary sources (e.g., local histories, a local recognition program, research studies, previous heritage impact assessment reports, etc.) or local knowledge or Aboriginal oral history, associating the subject property/ area with historic events, activities or persons? |



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## Screening for Impacts to Built Heritage and Cultural Heritage Landscapes

This checklist is intended to help proponents determine whether their project could affect known or potential cultural heritage resources. The completed checklist should be returned to the appropriate Heritage Planner or Heritage Advisor at the Ministry of Tourism and Culture.

### Step 1 – Screening for Recognized Cultural Heritage Value

| YES                      | NO                       | Unknown                  |                                                                                                                                         |
|--------------------------|--------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Is the subject property designated or adjacent* to a property designated under the <i>Ontario Heritage Act</i> ?                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Is the subject property listed on the municipal heritage register or a provincial register/list? (e.g. Ontario Heritage Bridge List) |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the subject property within or adjacent to a Heritage Conservation District?                                                      |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. Does the subject property have an Ontario Heritage Trust easement or is it adjacent to such a property?                              |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Is there a provincial or federal plaque on or near the subject property?                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Is the subject property a National Historic Site?                                                                                    |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Is the subject property recognized or valued by an Aboriginal community?                                                             |

### Step 2 – Screening Potential Resources

| YES                      | NO                       | Unknown                  |                                                                                                                                                                                                                                                                                                                |
|--------------------------|--------------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <b>Built heritage resources</b>                                                                                                                                                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Does the subject property or an adjacent property contain any buildings or structures <b>over forty years old</b> <sup>†</sup> that are:                                                                                                                                                                    |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Residential structures (e.g. house, apartment building, shanty or trap line shelter)                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Farm buildings (e.g. barns, outbuildings, silos, windmills)                                                                                                                                                                                                                                                  |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Industrial, commercial or institutional buildings (e.g. a factory, school, etc.)                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Engineering works (e.g. bridges, water or communications towers, roads, water/sewer systems, dams, earthworks, etc.)                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Monuments or Landmark Features (e.g. cairns, statues, obelisks, fountains, reflecting pools, retaining walls, boundary or claim markers, etc.)                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Is the subject property or an adjacent property associated with a known architect or builder?                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the subject property or an adjacent property associated with a person or event of historic interest?                                                                                                                                                                                                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. When the municipal heritage planner was contacted regarding potential cultural heritage value of the subject property, did they express interest or concern?                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <b>Cultural heritage landscapes</b>                                                                                                                                                                                                                                                                            |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Does the subject property contain landscape features such as:                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Burial sites and/or cemeteries                                                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Parks or gardens                                                                                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Quarries, mining, industrial or farming operations                                                                                                                                                                                                                                                           |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Canals                                                                                                                                                                                                                                                                                                       |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Prominent natural features that could have special value to people (such as waterfalls, rocky outcrops, large specimen trees, caves, etc.)                                                                                                                                                                   |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Evidence of other human-made alterations to the natural landscape (such as trails, boundary or way-finding markers, mounds, earthworks, cultivation, non-native species, etc.)                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Is the subject property within a Canadian Heritage River watershed?                                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Is the subject property near the Rideau Canal Corridor UNESCO World Heritage Site?                                                                                                                                                                                                                          |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 8. Is there any evidence from documentary sources (e.g., local histories, a local recognition program, research studies, previous heritage impact assessment reports, etc.) or local knowledge or Aboriginal oral history, associating the subject property/ area with historic events, activities or persons? |

## Screening for Impacts to Built Heritage and Cultural Heritage Landscapes

This checklist is intended to help proponents determine whether their project could affect known or potential cultural heritage resources. The completed checklist should be returned to the appropriate Heritage Planner or Heritage Advisor at the Ministry of Tourism and Culture.

### Step 1 – Screening for Recognized Cultural Heritage Value

| YES                      | NO                       | Unknown                  |                                                                                                                                         |
|--------------------------|--------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Is the subject property designated or adjacent* to a property designated under the <i>Ontario Heritage Act</i> ?                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Is the subject property listed on the municipal heritage register or a provincial register/list? (e.g. Ontario Heritage Bridge List) |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the subject property within or adjacent to a Heritage Conservation District?                                                      |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. Does the subject property have an Ontario Heritage Trust easement or is it adjacent to such a property?                              |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Is there a provincial or federal plaque on or near the subject property?                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Is the subject property a National Historic Site?                                                                                    |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Is the subject property recognized or valued by an Aboriginal community?                                                             |

### Step 2 – Screening Potential Resources

| YES                      | NO                       | Unknown                  |                                                                                                                                                                                                                                                                                                                |
|--------------------------|--------------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <b>Built heritage resources</b>                                                                                                                                                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Does the subject property or an adjacent property contain any buildings or structures <b>over forty years old</b> <sup>†</sup> that are:                                                                                                                                                                    |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Residential structures (e.g. house, apartment building, shanty or trap line shelter)                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Farm buildings (e.g. barns, outbuildings, silos, windmills)                                                                                                                                                                                                                                                  |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Industrial, commercial or institutional buildings (e.g. a factory, school, etc.)                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Engineering works (e.g. bridges, water or communications towers, roads, water/sewer systems, dams, earthworks, etc.)                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Monuments or Landmark Features (e.g. cairns, statues, obelisks, fountains, reflecting pools, retaining walls, boundary or claim markers, etc.)                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Is the subject property or an adjacent property associated with a known architect or builder?                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the subject property or an adjacent property associated with a person or event of historic interest?                                                                                                                                                                                                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. When the municipal heritage planner was contacted regarding potential cultural heritage value of the subject property, did they express interest or concern?                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <b>Cultural heritage landscapes</b>                                                                                                                                                                                                                                                                            |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Does the subject property contain landscape features such as:                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Burial sites and/or cemeteries                                                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Parks or gardens                                                                                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Quarries, mining, industrial or farming operations                                                                                                                                                                                                                                                           |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Canals                                                                                                                                                                                                                                                                                                       |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Prominent natural features that could have special value to people (such as waterfalls, rocky outcrops, large specimen trees, caves, etc.)                                                                                                                                                                   |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Evidence of other human-made alterations to the natural landscape (such as trails, boundary or way-finding markers, mounds, earthworks, cultivation, non-native species, etc.)                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Is the subject property within a Canadian Heritage River watershed?                                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Is the subject property near the Rideau Canal Corridor UNESCO World Heritage Site?                                                                                                                                                                                                                          |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 8. Is there any evidence from documentary sources (e.g., local histories, a local recognition program, research studies, previous heritage impact assessment reports, etc.) or local knowledge or Aboriginal oral history, associating the subject property/ area with historic events, activities or persons? |

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**Note:**

If the answer is "yes" to any question in Step 1, proceed to Step 3.

The following resources can assist in answering questions in Step 1:

**Municipal Clerk or Planning Department** – Information on properties designated under the Ontario Heritage Act (individual properties or Heritage Conservation Districts) and properties listed on a Municipal Heritage register.

**Ontario Heritage Trust** – Contact the OHT directly regarding easement properties. A list of OHT plaques can be found on the website: [Ontario Heritage Trust](#)

**Parks Canada** – A list of National Historic Sites can be found on the website: [Parks Canada](#)

**Ministry of Tourism and Culture** – The Ontario Heritage Properties Database includes close to 8000 identified heritage properties. Note while this database is a valuable resource, it has not been updated since 2005, and therefore is not comprehensive or exhaustive. [Ontario Heritage Properties Database](#)

**Local or Provincial archives**

**Local heritage organizations**, such as the municipal heritage committee, historical society, local branch of the Architectural Conservancy of Ontario, etc.

Consideration should also be given to obtaining oral evidence of CHRs. For example, in many Aboriginal communities, an important means of maintaining knowledge of cultural heritage resources is through oral tradition.

If the answer is "yes" to any question in Step 2, an evaluation of cultural heritage value is required. If cultural heritage resources are identified, proceed to Step 3.

If the answer to any question in Step 1 or to questions 2-4, 6-8 in Step 2, is "unknown", further research is required.

If the answer is "yes" to any of the questions in Step 3, a heritage impact assessment is required.

If uncertainty exists at any point, the services of a qualified person should be retained to assist in completing this checklist. All cultural heritage evaluation reports and heritage impact assessment reports must be prepared by a qualified person. Qualified persons means individuals (professional engineers, architects, archaeologists, etc.) having relevant, recent experience in the identification and conservation of cultural heritage resources. Appropriate evaluation involves gathering and recording information about the property sufficient to understand and substantiate its heritage value; determining cultural heritage value or interest based on the advice of qualified persons and with appropriate community input. If the property meets the criteria in Ontario Regulation 9/06 under the Ontario Heritage Act, it is a cultural heritage resource.

† The 40 year old threshold is an indicator of potential when conducting a preliminary survey for identification of cultural heritage resources. While the presence of a built feature that is 40 or more years old does not automatically signify cultural heritage value, it does make it more likely that the property could have cultural heritage value or interest. Similarly, if all the built features on a property are less than 40 years old, this does not automatically mean the property has no cultural heritage value. Note that age is not a criterion for designation under the Ontario Heritage Act.

### Step 3 – Screening for Potential Impacts

| YES                                 | NO                                  | Will the proposed undertaking/project involve or result in any of the following potential impacts to the subject property or an adjacent* property?                             |
|-------------------------------------|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Destruction, removal or relocation</b> of any, or part of any, heritage attribute or feature.                                                                                |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <b>Alteration</b> (which means a change in any manner and includes restoration, renovation, repair or disturbance).                                                             |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Shadows</b> created that alter the appearance of a heritage attribute or change the exposure or visibility of a natural feature or plantings, such as a garden.              |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Isolation</b> of a heritage attribute from its surrounding environment, context or a significant relationship.                                                               |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Direct or indirect obstruction</b> of significant views or vistas from, within, or to a built or natural heritage feature.                                                   |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>A change in land use</b> such as rezoning a battlefield from open space to residential use, allowing new development or site alteration to fill in the formerly open spaces. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <b>Soil disturbance</b> such as a change in grade, or an alteration of the drainage pattern, or excavation, etc.                                                                |

\* For the purposes of evaluating potential impacts of development and site alteration "adjacent" means: contiguous properties as well as properties that are separated from a heritage property by narrow strip of land used as a public or private road, highway, street, lane, trail, right-of way, walkway, green space, park, and/or easement or as otherwise defined in the municipal official plan.



## Screening for Impacts to Built Heritage and Cultural Heritage Landscapes

This checklist is intended to help proponents determine whether their project could affect known or potential cultural heritage resources. The completed checklist should be returned to the appropriate Heritage Planner or Heritage Advisor at the Ministry of Tourism and Culture.

### Step 1 – Screening for Recognized Cultural Heritage Value

| YES                      | NO                                  | Unknown                             |                                                                                                                                         |
|--------------------------|-------------------------------------|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 1. Is the subject property designated or adjacent* to a property designated under the <i>Ontario Heritage Act</i> ?                     |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 2. Is the subject property listed on the municipal heritage register or a provincial register/list? (e.g. Ontario Heritage Bridge List) |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 3. Is the subject property within or adjacent to a Heritage Conservation District?                                                      |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 4. Does the subject property have an Ontario Heritage Trust easement or is it adjacent to such a property?                              |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 5. Is there a provincial or federal plaque on or near the subject property?                                                             |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 6. Is the subject property a National Historic Site?                                                                                    |
| <input type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | 7. Is the subject property recognized or valued by an Aboriginal community?                                                             |

### Step 2 – Screening Potential Resources

| YES                                 | NO                                  | Unknown                             |                                                                                                                                                                                                                                                                                                                |
|-------------------------------------|-------------------------------------|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <b>Built heritage resources</b>                                                                                                                                                                                                                                                                                |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 1. Does the subject property or an adjacent property contain any buildings or structures <b>over forty years old</b> <sup>†</sup> that are:                                                                                                                                                                    |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Residential structures (e.g. house, apartment building, shanty or trap line shelter)                                                                                                                                                                                                                         |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Farm buildings (e.g. barns, outbuildings, silos, windmills)                                                                                                                                                                                                                                                  |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Industrial, commercial or institutional buildings (e.g. a factory, school, etc.)                                                                                                                                                                                                                             |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Engineering works (e.g. bridges, water or communications towers, roads, water/sewer systems, dams, earthworks, etc.)                                                                                                                                                                                         |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Monuments or Landmark Features (e.g. cairns, statues, obelisks, fountains, reflecting pools, retaining walls, boundary or claim markers, etc.)                                                                                                                                                               |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 2. Is the subject property or an adjacent property associated with a known architect or builder?                                                                                                                                                                                                               |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 3. Is the subject property or an adjacent property associated with a person or event of historic interest?                                                                                                                                                                                                     |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | 4. When the municipal heritage planner was contacted regarding potential cultural heritage value of the subject property, did they express interest or concern?                                                                                                                                                |
| <b>YES</b>                          | <b>NO</b>                           | <b>Unknown</b>                      | <b>Cultural heritage landscapes</b>                                                                                                                                                                                                                                                                            |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 5. Does the subject property contain landscape features such as:                                                                                                                                                                                                                                               |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Burial sites and/or cemeteries                                                                                                                                                                                                                                                                               |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Parks or gardens                                                                                                                                                                                                                                                                                             |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Quarries, mining, industrial or farming operations                                                                                                                                                                                                                                                           |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Canals                                                                                                                                                                                                                                                                                                       |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Prominent natural features that could have special value to people (such as waterfalls, rocky outcrops, large specimen trees, caves, etc.)                                                                                                                                                                   |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | ▪ Evidence of other human-made alterations to the natural landscape (such as trails, boundary or way-finding markers, mounds, earthworks, cultivation, non-native species, etc.)                                                                                                                               |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 6. Is the subject property within a Canadian Heritage River watershed?                                                                                                                                                                                                                                         |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 7. Is the subject property near the Rideau Canal Corridor UNESCO World Heritage Site?                                                                                                                                                                                                                          |
| <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | 8. Is there any evidence from documentary sources (e.g., local histories, a local recognition program, research studies, previous heritage impact assessment reports, etc.) or local knowledge or Aboriginal oral history, associating the subject property/ area with historic events, activities or persons? |

## Screening for Impacts to Built Heritage and Cultural Heritage Landscapes

This checklist is intended to help proponents determine whether their project could affect known or potential cultural heritage resources. The completed checklist should be returned to the appropriate Heritage Planner or Heritage Advisor at the Ministry of Tourism and Culture.

### Step 1 – Screening for Recognized Cultural Heritage Value

| YES                      | NO                       | Unknown                  |                                                                                                                                         |
|--------------------------|--------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Is the subject property designated or adjacent* to a property designated under the <i>Ontario Heritage Act</i> ?                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Is the subject property listed on the municipal heritage register or a provincial register/list? (e.g. Ontario Heritage Bridge List) |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the subject property within or adjacent to a Heritage Conservation District?                                                      |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. Does the subject property have an Ontario Heritage Trust easement or is it adjacent to such a property?                              |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Is there a provincial or federal plaque on or near the subject property?                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Is the subject property a National Historic Site?                                                                                    |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Is the subject property recognized or valued by an Aboriginal community?                                                             |

### Step 2 – Screening Potential Resources

| YES                      | NO                       | Unknown                  |                                                                                                                                                                                                                                                                                                                |
|--------------------------|--------------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <b>Built heritage resources</b>                                                                                                                                                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Does the subject property or an adjacent property contain any buildings or structures <b>over forty years old*</b> that are:                                                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Residential structures (e.g. house, apartment building, shanty or trap line shelter)                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Farm buildings (e.g. barns, outbuildings, silos, windmills)                                                                                                                                                                                                                                                  |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Industrial, commercial or institutional buildings (e.g. a factory, school, etc.)                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Engineering works (e.g. bridges, water or communications towers, roads, water/sewer systems, dams, earthworks, etc.)                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Monuments or Landmark Features (e.g. cairns, statues, obelisks, fountains, reflecting pools, retaining walls, boundary or claim markers, etc.)                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Is the subject property or an adjacent property associated with a known architect or builder?                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the subject property or an adjacent property associated with a person or event of historic interest?                                                                                                                                                                                                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. When the municipal heritage planner was contacted regarding potential cultural heritage value of the subject property, did they express interest or concern?                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <b>Cultural heritage landscapes</b>                                                                                                                                                                                                                                                                            |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Does the subject property contain landscape features such as:                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Burial sites and/or cemeteries                                                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Parks or gardens                                                                                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Quarries, mining, industrial or farming operations                                                                                                                                                                                                                                                           |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Canals                                                                                                                                                                                                                                                                                                       |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Prominent natural features that could have special value to people (such as waterfalls, rocky outcrops, large specimen trees, caves, etc.)                                                                                                                                                                   |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Evidence of other human-made alterations to the natural landscape (such as trails, boundary or way-finding markers, mounds, earthworks, cultivation, non-native species, etc.)                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Is the subject property within a Canadian Heritage River watershed?                                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Is the subject property near the Rideau Canal Corridor UNESCO World Heritage Site?                                                                                                                                                                                                                          |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 8. Is there any evidence from documentary sources (e.g., local histories, a local recognition program, research studies, previous heritage impact assessment reports, etc.) or local knowledge or Aboriginal oral history, associating the subject property/ area with historic events, activities or persons? |

## Screening for Impacts to Built Heritage and Cultural Heritage Landscapes

This checklist is intended to help proponents determine whether their project could affect known or potential cultural heritage resources. The completed checklist should be returned to the appropriate Heritage Planner or Heritage Advisor at the Ministry of Tourism and Culture.

### Step 1 – Screening for Recognized Cultural Heritage Value

| YES                      | NO                       | Unknown                  |                                                                                                                                         |
|--------------------------|--------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Is the subject property designated or adjacent* to a property designated under the <i>Ontario Heritage Act</i> ?                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Is the subject property listed on the municipal heritage register or a provincial register/list? (e.g. Ontario Heritage Bridge List) |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the subject property within or adjacent to a Heritage Conservation District?                                                      |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. Does the subject property have an Ontario Heritage Trust easement or is it adjacent to such a property?                              |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Is there a provincial or federal plaque on or near the subject property?                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Is the subject property a National Historic Site?                                                                                    |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Is the subject property recognized or valued by an Aboriginal community?                                                             |

### Step 2 – Screening Potential Resources

| YES                      | NO                       | Unknown                  |                                                                                                                                                                                                                                                                                                                |
|--------------------------|--------------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <b>Built heritage resources</b>                                                                                                                                                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Does the subject property or an adjacent property contain any buildings or structures <b>over forty years old<sup>†</sup></b> that are:                                                                                                                                                                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Residential structures (e.g. house, apartment building, shanty or trap line shelter)                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Farm buildings (e.g. barns, outbuildings, silos, windmills)                                                                                                                                                                                                                                                  |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Industrial, commercial or institutional buildings (e.g. a factory, school, etc.)                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Engineering works (e.g. bridges, water or communications towers, roads, water/sewer systems, dams, earthworks, etc.)                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Monuments or Landmark Features (e.g. cairns, statues, obelisks, fountains, reflecting pools, retaining walls, boundary or claim markers, etc.)                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Is the subject property or an adjacent property associated with a known architect or builder?                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the subject property or an adjacent property associated with a person or event of historic interest?                                                                                                                                                                                                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. When the municipal heritage planner was contacted regarding potential cultural heritage value of the subject property, did they express interest or concern?                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <b>Cultural heritage landscapes</b>                                                                                                                                                                                                                                                                            |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Does the subject property contain landscape features such as:                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Burial sites and/or cemeteries                                                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Parks or gardens                                                                                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Quarries, mining, industrial or farming operations                                                                                                                                                                                                                                                           |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Canals                                                                                                                                                                                                                                                                                                       |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Prominent natural features that could have special value to people (such as waterfalls, rocky outcrops, large specimen trees, caves, etc.)                                                                                                                                                                   |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Evidence of other human-made alterations to the natural landscape (such as trails, boundary or way-finding markers, mounds, earthworks, cultivation, non-native species, etc.)                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Is the subject property within a Canadian Heritage River watershed?                                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Is the subject property near the Rideau Canal Corridor UNESCO World Heritage Site?                                                                                                                                                                                                                          |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 8. Is there any evidence from documentary sources (e.g., local histories, a local recognition program, research studies, previous heritage impact assessment reports, etc.) or local knowledge or Aboriginal oral history, associating the subject property/ area with historic events, activities or persons? |



## Screening for Impacts to Built Heritage and Cultural Heritage Landscapes

This checklist is intended to help proponents determine whether their project could affect known or potential cultural heritage resources. The completed checklist should be returned to the appropriate Heritage Planner or Heritage Advisor at the Ministry of Tourism and Culture.

### Step 1 – Screening for Recognized Cultural Heritage Value

| YES                      | NO                                  | Unknown                             |                                                                                                                                         |
|--------------------------|-------------------------------------|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 1. Is the subject property designated or adjacent* to a property designated under the <i>Ontario Heritage Act</i> ?                     |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 2. Is the subject property listed on the municipal heritage register or a provincial register/list? (e.g. Ontario Heritage Bridge List) |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 3. Is the subject property within or adjacent to a Heritage Conservation District?                                                      |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 4. Does the subject property have an Ontario Heritage Trust easement or is it adjacent to such a property?                              |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 5. Is there a provincial or federal plaque on or near the subject property?                                                             |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 6. Is the subject property a National Historic Site?                                                                                    |
| <input type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | 7. Is the subject property recognized or valued by an Aboriginal community?                                                             |

### Step 2 – Screening Potential Resources

| YES                      | NO                                  | Unknown                             |                                                                                                                                                                                                                                                                                                                |
|--------------------------|-------------------------------------|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <b>Built heritage resources</b>                                                                                                                                                                                                                                                                                |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 1. Does the subject property or an adjacent property contain any buildings or structures <b>over forty years old</b> <sup>†</sup> that are:                                                                                                                                                                    |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Residential structures (e.g. house, apartment building, shanty or trap line shelter)                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Farm buildings (e.g. barns, outbuildings, silos, windmills)                                                                                                                                                                                                                                                  |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Industrial, commercial or institutional buildings (e.g. a factory, school, etc.)                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Engineering works (e.g. bridges, water or communications towers, roads, water/sewer systems, dams, earthworks, etc.)                                                                                                                                                                                         |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Monuments or Landmark Features (e.g. cairns, statues, obelisks, fountains, reflecting pools, retaining walls, boundary or claim markers, etc.)                                                                                                                                                               |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 2. Is the subject property or an adjacent property associated with a known architect or builder?                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 3. Is the subject property or an adjacent property associated with a person or event of historic interest?                                                                                                                                                                                                     |
| <input type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | 4. When the municipal heritage planner was contacted regarding potential cultural heritage value of the subject property, did they express interest or concern?                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Cultural heritage landscapes</b>                                                                                                                                                                                                                                                                            |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 5. Does the subject property contain landscape features such as:                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Burial sites and/or cemeteries                                                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Parks or gardens                                                                                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Quarries, mining, industrial or farming operations                                                                                                                                                                                                                                                           |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Canals                                                                                                                                                                                                                                                                                                       |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Prominent natural features that could have special value to people (such as waterfalls, rocky outcrops, large specimen trees, caves, etc.)                                                                                                                                                                   |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Evidence of other human-made alterations to the natural landscape (such as trails, boundary or way-finding markers, mounds, earthworks, cultivation, non-native species, etc.)                                                                                                                               |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 6. Is the subject property within a Canadian Heritage River watershed?                                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 7. Is the subject property near the Rideau Canal Corridor UNESCO World Heritage Site?                                                                                                                                                                                                                          |
| <input type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | 8. Is there any evidence from documentary sources (e.g., local histories, a local recognition program, research studies, previous heritage impact assessment reports, etc.) or local knowledge or Aboriginal oral history, associating the subject property/ area with historic events, activities or persons? |

**Note:**

If the answer is "yes" to any question in Step 1, proceed to Step 3.

The following resources can assist in answering questions in Step 1:

**Municipal Clerk or Planning Department** – Information on properties designated under the Ontario Heritage Act (individual properties or Heritage Conservation Districts) and properties listed on a Municipal Heritage register.

**Ontario Heritage Trust** – Contact the OHT directly regarding easement properties. A list of OHT plaques can be found on the website: [Ontario Heritage Trust](http://OntarioHeritageTrust.com)

**Parks Canada** – A list of National Historic Sites can be found on the website: [Parks Canada](http://ParksCanada.gc.ca)

**Ministry of Tourism and Culture** – The Ontario Heritage Properties Database includes close to 8000 identified heritage properties. Note while this database is a valuable resource, it has not been updated since 2005, and therefore is not comprehensive or exhaustive. [Ontario Heritage Properties Database](http://OntarioHeritagePropertiesDatabase.com)

**Local or Provincial archives**

**Local heritage organizations**, such as the municipal heritage committee, historical society, local branch of the Architectural Conservancy of Ontario, etc.

Consideration should also be given to obtaining oral evidence of CHRs. For example, in many Aboriginal communities, an important means of maintaining knowledge of cultural heritage resources is through oral tradition.

If the answer is "yes" to any question in Step 2, an evaluation of cultural heritage value is required. If cultural heritage resources are identified, proceed to Step 3.

If the answer to any question in Step 1 or to questions 2-4, 6-8 in Step 2, is "unknown", further research is required.

If the answer is "yes" to any of the questions in Step 3, a heritage impact assessment is required.

If uncertainty exists at any point, the services of a qualified person should be retained to assist in completing this checklist. All cultural heritage evaluation reports and heritage impact assessment reports must be prepared by a qualified person. Qualified persons means individuals (professional engineers, architects, archaeologists, etc.) having relevant, recent experience in the identification and conservation of cultural heritage resources. Appropriate evaluation involves gathering and recording information about the property sufficient to understand and substantiate its heritage value; determining cultural heritage value or interest based on the advice of qualified persons and with appropriate community input. If the property meets the criteria in Ontario Regulation 9/06 under the Ontario Heritage Act, it is a cultural heritage resource.

† The 40 year old threshold is an indicator of potential when conducting a preliminary survey for identification of cultural heritage resources. While the presence of a built feature that is 40 or more years old does not automatically signify cultural heritage value, it does make it more likely that the property could have cultural heritage value or interest. Similarly, if all the built features on a property are less than 40 years old, this does not automatically mean the property has no cultural heritage value. Note that age is not a criterion for designation under the Ontario Heritage Act.

### Step 3 – Screening for Potential Impacts

| YES                                 | NO                                  | Will the proposed undertaking/project involve or result in any of the following potential impacts to the subject property or an adjacent* property?                             |
|-------------------------------------|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Destruction, removal or relocation</b> of any, or part of any, heritage attribute or feature.                                                                                |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <b>Alteration</b> (which means a change in any manner and includes restoration, renovation, repair or disturbance).                                                             |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Shadows</b> created that alter the appearance of a heritage attribute or change the exposure or visibility of a natural feature or plantings, such as a garden.              |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Isolation</b> of a heritage attribute from its surrounding environment, context or a significant relationship.                                                               |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Direct or indirect obstruction</b> of significant views or vistas from, within, or to a built or natural heritage feature.                                                   |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>A change in land use</b> such as rezoning a battlefield from open space to residential use, allowing new development or site alteration to fill in the formerly open spaces. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <b>Soil disturbance</b> such as a change in grade, or an alteration of the drainage pattern, or excavation, etc.                                                                |

\* For the purposes of evaluating potential impacts of development and site alteration "adjacent" means, contiguous properties as well as properties that are separated from a heritage property by narrow strip of land used as a public or private road, highway, street, lane, trail, right-of-way, walkway, green space, park, and/or easement or as otherwise defined in the municipal official plan.

## Screening for Impacts to Built Heritage and Cultural Heritage Landscapes

This checklist is intended to help proponents determine whether their project could affect known or potential cultural heritage resources. The completed checklist should be returned to the appropriate Heritage Planner or Heritage Advisor at the Ministry of Tourism and Culture.

### Step 1 – Screening for Recognized Cultural Heritage Value

| YES                                 | NO                                  | Unknown                             |                                                                                                                                         |
|-------------------------------------|-------------------------------------|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 1. Is the subject property designated or adjacent* to a property designated under the <i>Ontario Heritage Act</i> ?                     |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | 2. Is the subject property listed on the municipal heritage register or a provincial register/list? (e.g. Ontario Heritage Bridge List) |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 3. Is the subject property within or adjacent to a Heritage Conservation District?                                                      |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 4. Does the subject property have an Ontario Heritage Trust easement or is it adjacent to such a property?                              |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 5. Is there a provincial or federal plaque on or near the subject property?                                                             |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 6. Is the subject property a National Historic Site?                                                                                    |
| <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | 7. Is the subject property recognized or valued by an Aboriginal community?                                                             |

### Step 2 – Screening Potential Resources

| YES                                 | NO                                  | Unknown                             |                                                                                                                                                                                                                                                                                                                |
|-------------------------------------|-------------------------------------|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <b>Built heritage resources</b>                                                                                                                                                                                                                                                                                |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 1. Does the subject property or an adjacent property contain any buildings or structures <b>over forty years old</b> <sup>†</sup> that are:                                                                                                                                                                    |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Residential structures (e.g. house, apartment building, shanty or trap line shelter)                                                                                                                                                                                                                         |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Farm buildings (e.g. barns, outbuildings, silos, windmills)                                                                                                                                                                                                                                                  |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Industrial, commercial or institutional buildings (e.g. a factory, school, etc.)                                                                                                                                                                                                                             |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Engineering works (e.g. bridges, water or communications towers, roads, water/sewer systems, dams, earthworks, etc.)                                                                                                                                                                                         |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Monuments or Landmark Features (e.g. cairns, statues, obelisks, fountains, reflecting pools, retaining walls, boundary or claim markers, etc.)                                                                                                                                                               |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 2. Is the subject property or an adjacent property associated with a known architect or builder?                                                                                                                                                                                                               |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | 3. Is the subject property or an adjacent property associated with a person or event of historic interest?                                                                                                                                                                                                     |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | 4. When the municipal heritage planner was contacted regarding potential cultural heritage value of the subject property, did they express interest or concern?                                                                                                                                                |
| <b>YES</b>                          | <b>NO</b>                           | <b>Unknown</b>                      | <b>Cultural heritage landscapes</b>                                                                                                                                                                                                                                                                            |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | 5. Does the subject property contain landscape features such as:                                                                                                                                                                                                                                               |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | ▪ Burial sites and/or cemeteries                                                                                                                                                                                                                                                                               |
| <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | ▪ Parks or gardens                                                                                                                                                                                                                                                                                             |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Quarries, mining, industrial or farming operations                                                                                                                                                                                                                                                           |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Canals                                                                                                                                                                                                                                                                                                       |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Prominent natural features that could have special value to people (such as waterfalls, rocky outcrops, large specimen trees, caves, etc.)                                                                                                                                                                   |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Evidence of other human-made alterations to the natural landscape (such as trails, boundary or way-finding markers, mounds, earthworks, cultivation, non-native species, etc.)                                                                                                                               |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 6. Is the subject property within a Canadian Heritage River watershed?                                                                                                                                                                                                                                         |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 7. Is the subject property near the Rideau Canal Corridor UNESCO World Heritage Site?                                                                                                                                                                                                                          |
| <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | 8. Is there any evidence from documentary sources (e.g., local histories, a local recognition program, research studies, previous heritage impact assessment reports, etc.) or local knowledge or Aboriginal oral history, associating the subject property/ area with historic events, activities or persons? |



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**Note:**

If the answer is "yes" to any question in Step 1, proceed to Step 3.

The following resources can assist in answering questions in Step 1:

**Municipal Clerk or Planning Department** – Information on properties designated under the Ontario Heritage Act (individual properties or Heritage Conservation Districts) and properties listed on a Municipal Heritage register.

**Ontario Heritage Trust** – Contact the OHT directly regarding easement properties. A list of OHT plaques can be found on the website: [Ontario Heritage Trust](#)

**Parks Canada** – A list of National Historic Sites can be found on the website: [Parks Canada](#)

**Ministry of Tourism and Culture** – The Ontario Heritage Properties Database includes close to 8000 identified heritage properties. Note while this database is a valuable resource, it has not been updated since 2005, and therefore is not comprehensive or exhaustive. [Ontario Heritage Properties Database](#)

**Local or Provincial archives**

**Local heritage organizations**, such as the municipal heritage committee, historical society, local branch of the Architectural Conservancy of Ontario, etc.

Consideration should also be given to obtaining oral evidence of CHRs. For example, in many Aboriginal communities, an important means of maintaining knowledge of cultural heritage resources is through oral tradition.

If the answer is "yes" to any question in Step 2, an evaluation of cultural heritage value is required. If cultural heritage resources are identified, proceed to Step 3.

If the answer to any question in Step 1 or to questions 2-4, 6-8 in Step 2, is "unknown", further research is required.

If the answer is "yes" to any of the questions in Step 3, a heritage impact assessment is required.

If uncertainty exists at any point, the services of a qualified person should be retained to assist in completing this checklist. All cultural heritage evaluation reports and heritage impact assessment reports must be prepared by a qualified person. Qualified persons means individuals (professional engineers, architects, archaeologists, etc.) having relevant, recent experience in the identification and conservation of cultural heritage resources. Appropriate evaluation involves gathering and recording information about the property sufficient to understand and substantiate its heritage value; determining cultural heritage value or interest based on the advice of qualified persons and with appropriate community input. If the property meets the criteria in Ontario Regulation 9/06 under the Ontario Heritage Act, it is a cultural heritage resource.

† The 40 year old threshold is an indicator of potential when conducting a preliminary survey for identification of cultural heritage resources. While the presence of a built feature that is 40 or more years old does not automatically signify cultural heritage value, it does make it more likely that the property could have cultural heritage value or interest. Similarly, if all the built features on a property are less than 40 years old, this does not automatically mean the property has no cultural heritage value. Note that age is not a criterion for designation under the Ontario Heritage Act.

### Step 3 – Screening for Potential Impacts

| YES                                 | NO                                  | Will the proposed undertaking/project involve or result in any of the following potential impacts to the subject property or an adjacent* property?                             |
|-------------------------------------|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Destruction, removal or relocation</b> of any, or part of any, heritage attribute or feature.                                                                                |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <b>Alteration</b> (which means a change in any manner and includes restoration, renovation, repair or disturbance).                                                             |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Shadows</b> created that alter the appearance of a heritage attribute or change the exposure or visibility of a natural feature or plantings, such as a garden.              |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Isolation</b> of a heritage attribute from its surrounding environment, context or a significant relationship.                                                               |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Direct or indirect obstruction</b> of significant views or vistas from, within, or to a built or natural heritage feature.                                                   |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>A change in land use</b> such as rezoning a battlefield from open space to residential use, allowing new development or site alteration to fill in the formerly open spaces. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <b>Soil disturbance</b> such as a change in grade, or an alteration of the drainage pattern, or excavation, etc.                                                                |

\* For the purposes of evaluating potential impacts of development and site alteration "adjacent" means: contiguous properties as well as properties that are separated from a heritage property by narrow strip of land used as a public or private road, highway, street, lane, trail, right-of way, walkway, green space, park, and/or easement or as otherwise defined in the municipal official plan.

## Screening for Impacts to Built Heritage and Cultural Heritage Landscapes

This checklist is intended to help proponents determine whether their project could affect known or potential cultural heritage resources. The completed checklist should be returned to the appropriate Heritage Planner or Heritage Advisor at the Ministry of Tourism and Culture.

### Step 1 – Screening for Recognized Cultural Heritage Value

| YES                      | NO                       | Unknown                  |                                                                                                                                         |
|--------------------------|--------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Is the subject property designated or adjacent* to a property designated under the <i>Ontario Heritage Act</i> ?                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Is the subject property listed on the municipal heritage register or a provincial register/list? (e.g. Ontario Heritage Bridge List) |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the subject property within or adjacent to a Heritage Conservation District?                                                      |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. Does the subject property have an Ontario Heritage Trust easement or is it adjacent to such a property?                              |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Is there a provincial or federal plaque on or near the subject property?                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Is the subject property a National Historic Site?                                                                                    |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Is the subject property recognized or valued by an Aboriginal community?                                                             |

### Step 2 – Screening Potential Resources

| YES                      | NO                       | Unknown                  |                                                                                                                                                                                                                                                                                                                |
|--------------------------|--------------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <b>Built heritage resources</b>                                                                                                                                                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Does the subject property or an adjacent property contain any buildings or structures <b>over forty years old†</b> that are:                                                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Residential structures (e.g. house, apartment building, shanty or trap line shelter)                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Farm buildings (e.g. barns, outbuildings, silos, windmills)                                                                                                                                                                                                                                                  |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Industrial, commercial or institutional buildings (e.g. a factory, school, etc.)                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Engineering works (e.g. bridges, water or communications towers, roads, water/sewer systems, dams, earthworks, etc.)                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Monuments or Landmark Features (e.g. cairns, statues, obelisks, fountains, reflecting pools, retaining walls, boundary or claim markers, etc.)                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Is the subject property or an adjacent property associated with a known architect or builder?                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the subject property or an adjacent property associated with a person or event of historic interest?                                                                                                                                                                                                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. When the municipal heritage planner was contacted regarding potential cultural heritage value of the subject property, did they express interest or concern?                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <b>Cultural heritage landscapes</b>                                                                                                                                                                                                                                                                            |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Does the subject property contain landscape features such as:                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Burial sites and/or cemeteries                                                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Parks or gardens                                                                                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Quarries, mining, industrial or farming operations                                                                                                                                                                                                                                                           |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Canals                                                                                                                                                                                                                                                                                                       |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Prominent natural features that could have special value to people (such as waterfalls, rocky outcrops, large specimen trees, caves, etc.)                                                                                                                                                                   |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Evidence of other human-made alterations to the natural landscape (such as trails, boundary or way-finding markers, mounds, earthworks, cultivation, non-native species, etc.)                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Is the subject property within a Canadian Heritage River watershed?                                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Is the subject property near the Rideau Canal Corridor UNESCO World Heritage Site?                                                                                                                                                                                                                          |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 8. Is there any evidence from documentary sources (e.g., local histories, a local recognition program, research studies, previous heritage impact assessment reports, etc.) or local knowledge or Aboriginal oral history, associating the subject property/ area with historic events, activities or persons? |



## Screening for Impacts to Built Heritage and Cultural Heritage Landscapes

This checklist is intended to help proponents determine whether their project could affect known or potential cultural heritage resources. The completed checklist should be returned to the appropriate Heritage Planner or Heritage Advisor at the Ministry of Tourism and Culture.

### Step 1 – Screening for Recognized Cultural Heritage Value

| YES                      | NO                       | Unknown                  |                                                                                                                                         |
|--------------------------|--------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Is the subject property designated or adjacent* to a property designated under the <i>Ontario Heritage Act</i> ?                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Is the subject property listed on the municipal heritage register or a provincial register/list? (e.g. Ontario Heritage Bridge List) |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the subject property within or adjacent to a Heritage Conservation District?                                                      |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. Does the subject property have an Ontario Heritage Trust easement or is it adjacent to such a property?                              |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Is there a provincial or federal plaque on or near the subject property?                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Is the subject property a National Historic Site?                                                                                    |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Is the subject property recognized or valued by an Aboriginal community?                                                             |

### Step 2 – Screening Potential Resources

| YES                      | NO                       | Unknown                  |                                                                                                                                                                                                                                                                                                                |
|--------------------------|--------------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <b>Built heritage resources</b>                                                                                                                                                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Does the subject property or an adjacent property contain any buildings or structures <b>over forty years old</b> <sup>†</sup> that are:                                                                                                                                                                    |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Residential structures (e.g. house, apartment building, shanty or trap line shelter)                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Farm buildings (e.g. barns, outbuildings, silos, windmills)                                                                                                                                                                                                                                                  |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Industrial, commercial or institutional buildings (e.g. a factory, school, etc.)                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Engineering works (e.g. bridges, water or communications towers, roads, water/sewer systems, dams, earthworks, etc.)                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Monuments or Landmark Features (e.g. cairns, statues, obelisks, fountains, reflecting pools, retaining walls, boundary or claim markers, etc.)                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Is the subject property or an adjacent property associated with a known architect or builder?                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the subject property or an adjacent property associated with a person or event of historic interest?                                                                                                                                                                                                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. When the municipal heritage planner was contacted regarding potential cultural heritage value of the subject property, did they express interest or concern?                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <b>Cultural heritage landscapes</b>                                                                                                                                                                                                                                                                            |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Does the subject property contain landscape features such as:                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Burial sites and/or cemeteries                                                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Parks or gardens                                                                                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Quarries, mining, industrial or farming operations                                                                                                                                                                                                                                                           |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Canals                                                                                                                                                                                                                                                                                                       |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Prominent natural features that could have special value to people (such as waterfalls, rocky outcrops, large specimen trees, caves, etc.)                                                                                                                                                                   |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Evidence of other human-made alterations to the natural landscape (such as trails, boundary or way-finding markers, mounds, earthworks, cultivation, non-native species, etc.)                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Is the subject property within a Canadian Heritage River watershed?                                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Is the subject property near the Rideau Canal Corridor UNESCO World Heritage Site?                                                                                                                                                                                                                          |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 8. Is there any evidence from documentary sources (e.g., local histories, a local recognition program, research studies, previous heritage impact assessment reports, etc.) or local knowledge or Aboriginal oral history, associating the subject property/ area with historic events, activities or persons? |



## Screening for Impacts to Built Heritage and Cultural Heritage Landscapes

This checklist is intended to help proponents determine whether their project could affect known or potential cultural heritage resources. The completed checklist should be returned to the appropriate Heritage Planner or Heritage Advisor at the Ministry of Tourism and Culture.

### Step 1 – Screening for Recognized Cultural Heritage Value

| YES                      | NO                       | Unknown                  |                                                                                                                                         |
|--------------------------|--------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Is the subject property designated or adjacent* to a property designated under the <i>Ontario Heritage Act</i> ?                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Is the subject property listed on the municipal heritage register or a provincial register/list? (e.g. Ontario Heritage Bridge List) |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the subject property within or adjacent to a Heritage Conservation District?                                                      |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. Does the subject property have an Ontario Heritage Trust easement or is it adjacent to such a property?                              |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Is there a provincial or federal plaque on or near the subject property?                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Is the subject property a National Historic Site?                                                                                    |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Is the subject property recognized or valued by an Aboriginal community?                                                             |

### Step 2 – Screening Potential Resources

| YES                      | NO                       | Unknown                  |                                                                                                                                                                                                                                                                                                                |
|--------------------------|--------------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                          |                          |                          | <b>Built heritage resources</b>                                                                                                                                                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Does the subject property or an adjacent property contain any buildings or structures <b>over forty years old†</b> that are:                                                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Residential structures (e.g. house, apartment building, shanty or trap line shelter)                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Farm buildings (e.g. barns, outbuildings, silos, windmills)                                                                                                                                                                                                                                                  |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Industrial, commercial or institutional buildings (e.g. a factory, school, etc.)                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Engineering works (e.g. bridges, water or communications towers, roads, water/sewer systems, dams, earthworks, etc.)                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Monuments or Landmark Features (e.g. cairns, statues, obelisks, fountains, reflecting pools, retaining walls, boundary or claim markers, etc.)                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Is the subject property or an adjacent property associated with a known architect or builder?                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the subject property or an adjacent property associated with a person or event of historic interest?                                                                                                                                                                                                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. When the municipal heritage planner was contacted regarding potential cultural heritage value of the subject property, did they express interest or concern?                                                                                                                                                |
|                          |                          |                          | <b>Cultural heritage landscapes</b>                                                                                                                                                                                                                                                                            |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Does the subject property contain landscape features such as:                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Burial sites and/or cemeteries                                                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Parks or gardens                                                                                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Quarries, mining, industrial or farming operations                                                                                                                                                                                                                                                           |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Canals                                                                                                                                                                                                                                                                                                       |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Prominent natural features that could have special value to people (such as waterfalls, rocky outcrops, large specimen trees, caves, etc.)                                                                                                                                                                   |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Evidence of other human-made alterations to the natural landscape (such as trails, boundary or way-finding markers, mounds, earthworks, cultivation, non-native species, etc.)                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Is the subject property within a Canadian Heritage River watershed?                                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Is the subject property near the Rideau Canal Corridor UNESCO World Heritage Site?                                                                                                                                                                                                                          |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 8. Is there any evidence from documentary sources (e.g., local histories, a local recognition program, research studies, previous heritage impact assessment reports, etc.) or local knowledge or Aboriginal oral history, associating the subject property/ area with historic events, activities or persons? |

## Screening for Impacts to Built Heritage and Cultural Heritage Landscapes

This checklist is intended to help proponents determine whether their project could affect known or potential cultural heritage resources. The completed checklist should be returned to the appropriate Heritage Planner or Heritage Advisor at the Ministry of Tourism and Culture.

### Step 1 – Screening for Recognized Cultural Heritage Value

| YES                      | NO                       | Unknown                  |                                                                                                                                         |
|--------------------------|--------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Is the subject property designated or adjacent* to a property designated under the <i>Ontario Heritage Act</i> ?                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Is the subject property listed on the municipal heritage register or a provincial register/list? (e.g. Ontario Heritage Bridge List) |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the subject property within or adjacent to a Heritage Conservation District?                                                      |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. Does the subject property have an Ontario Heritage Trust easement or is it adjacent to such a property?                              |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Is there a provincial or federal plaque on or near the subject property?                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Is the subject property a National Historic Site?                                                                                    |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Is the subject property recognized or valued by an Aboriginal community?                                                             |

### Step 2 – Screening Potential Resources

| YES                      | NO                       | Unknown                  |                                                                                                                                                                                                                                                                                                                |
|--------------------------|--------------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <b>Built heritage resources</b>                                                                                                                                                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Does the subject property or an adjacent property contain any buildings or structures <b>over forty years old</b> <sup>†</sup> that are:                                                                                                                                                                    |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Residential structures (e.g. house, apartment building, shanty or trap line shelter)                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Farm buildings (e.g. barns, outbuildings, silos, windmills)                                                                                                                                                                                                                                                  |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Industrial, commercial or institutional buildings (e.g. a factory, school, etc.)                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Engineering works (e.g. bridges, water or communications towers, roads, water/sewer systems, dams, earthworks, etc.)                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Monuments or Landmark Features (e.g. cairns, statues, obelisks, fountains, reflecting pools, retaining walls, boundary or claim markers, etc.)                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Is the subject property or an adjacent property associated with a known architect or builder?                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the subject property or an adjacent property associated with a person or event of historic interest?                                                                                                                                                                                                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. When the municipal heritage planner was contacted regarding potential cultural heritage value of the subject property, did they express interest or concern?                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <b>Cultural heritage landscapes</b>                                                                                                                                                                                                                                                                            |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Does the subject property contain landscape features such as:                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Burial sites and/or cemeteries                                                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Parks or gardens                                                                                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Quarries, mining, industrial or farming operations                                                                                                                                                                                                                                                           |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Canals                                                                                                                                                                                                                                                                                                       |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Prominent natural features that could have special value to people (such as waterfalls, rocky outcrops, large specimen trees, caves, etc.)                                                                                                                                                                   |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Evidence of other human-made alterations to the natural landscape (such as trails, boundary or way-finding markers, mounds, earthworks, cultivation, non-native species, etc.)                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Is the subject property within a Canadian Heritage River watershed?                                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Is the subject property near the Rideau Canal Corridor UNESCO World Heritage Site?                                                                                                                                                                                                                          |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 8. Is there any evidence from documentary sources (e.g., local histories, a local recognition program, research studies, previous heritage impact assessment reports, etc.) or local knowledge or Aboriginal oral history, associating the subject property/ area with historic events, activities or persons? |

## Screening for Impacts to Built Heritage and Cultural Heritage Landscapes

This checklist is intended to help proponents determine whether their project could affect known or potential cultural heritage resources. The completed checklist should be returned to the appropriate Heritage Planner or Heritage Advisor at the Ministry of Tourism and Culture.

### Step 1 – Screening for Recognized Cultural Heritage Value

| YES                      | NO                       | Unknown                  |                                                                                                                                         |
|--------------------------|--------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Is the subject property designated or adjacent* to a property designated under the <i>Ontario Heritage Act</i> ?                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Is the subject property listed on the municipal heritage register or a provincial register/list (e.g. Ontario Heritage Bridge List)? |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the subject property within or adjacent to a Heritage Conservation District?                                                      |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. Does the subject property have an Ontario Heritage Trust easement or is it adjacent to such a property?                              |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Is there a provincial or federal plaque on or near the subject property?                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Is the subject property a National Historic Site?                                                                                    |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Is the subject property recognized or valued by an Aboriginal community?                                                             |

### Step 2 – Screening Potential Resources

| YES                      | NO                       | Unknown                  |                                                                                                                                                                                                                                                                                                                |
|--------------------------|--------------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <b>Built heritage resources</b>                                                                                                                                                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Does the subject property or an adjacent property contain any buildings or structures <b>over forty years old</b> <sup>†</sup> that are:                                                                                                                                                                    |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Residential structures (e.g. house, apartment building, shanty or trap line shelter)                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Farm buildings (e.g. barns, outbuildings, silos, windmills)                                                                                                                                                                                                                                                  |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Industrial, commercial or institutional buildings (e.g. a factory, school, etc.)                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Engineering works (e.g. bridges, water or communications towers, roads, water/sewer systems, dams, earthworks, etc.)                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Monuments or Landmark Features (e.g. cairns, statues, obelisks, fountains, reflecting pools, retaining walls, boundary or claim markers, etc.)                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Is the subject property or an adjacent property associated with a known architect or builder?                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the subject property or an adjacent property associated with a person or event of historic interest?                                                                                                                                                                                                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. When the municipal heritage planner was contacted regarding potential cultural heritage value of the subject property, did they express interest or concern?                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <b>Cultural heritage landscapes</b>                                                                                                                                                                                                                                                                            |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Does the subject property contain landscape features such as:                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Burial sites and/or cemeteries                                                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Parks or gardens                                                                                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Quarries, mining, industrial or farming operations                                                                                                                                                                                                                                                           |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Canals                                                                                                                                                                                                                                                                                                       |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Prominent natural features that could have special value to people (such as waterfalls, rocky outcrops, large specimen trees, caves, etc.)                                                                                                                                                                   |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Evidence of other human-made alterations to the natural landscape (such as trails, boundary or way-finding markers, mounds, earthworks, cultivation, non-native species, etc.)                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Is the subject property within a Canadian Heritage River watershed?                                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Is the subject property near the Rideau Canal Corridor UNESCO World Heritage Site?                                                                                                                                                                                                                          |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 8. Is there any evidence from documentary sources (e.g., local histories, a local recognition program, research studies, previous heritage impact assessment reports, etc.) or local knowledge or Aboriginal oral history, associating the subject property/ area with historic events, activities or persons? |



## Screening for Impacts to Built Heritage and Cultural Heritage Landscapes

This checklist is intended to help proponents determine whether their project could affect known or potential cultural heritage resources. The completed checklist should be returned to the appropriate Heritage Planner or Heritage Advisor at the Ministry of Tourism and Culture.

### Step 1 – Screening for Recognized Cultural Heritage Value

| YES                      | NO                                  | Unknown                             |                                                                                                                                         |
|--------------------------|-------------------------------------|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 1. Is the subject property designated or adjacent* to a property designated under the <i>Ontario Heritage Act</i> ?                     |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 2. Is the subject property listed on the municipal heritage register or a provincial register/list? (e.g. Ontario Heritage Bridge List) |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 3. Is the subject property within or adjacent to a Heritage Conservation District?                                                      |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 4. Does the subject property have an Ontario Heritage Trust easement or is it adjacent to such a property?                              |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 5. Is there a provincial or federal plaque on or near the subject property?                                                             |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 6. Is the subject property a National Historic Site?                                                                                    |
| <input type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | 7. Is the subject property recognized or valued by an Aboriginal community?                                                             |

### Step 2 – Screening Potential Resources

| YES                      | NO                                  | Unknown                             |                                                                                                                                                                                                                                                                                                                |
|--------------------------|-------------------------------------|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <b>Built heritage resources</b>                                                                                                                                                                                                                                                                                |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 1. Does the subject property or an adjacent property contain any buildings or structures <b>over forty years old†</b> that are:                                                                                                                                                                                |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Residential structures (e.g. house, apartment building, shanty or trap line shelter)                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Farm buildings (e.g. barns, outbuildings, silos, windmills)                                                                                                                                                                                                                                                  |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Industrial, commercial or institutional buildings (e.g. a factory, school, etc.)                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Engineering works (e.g. bridges, water or communications towers, roads, water/sewer systems, dams, earthworks, etc.)                                                                                                                                                                                         |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Monuments or Landmark Features (e.g. cairns, statues, obelisks, fountains, reflecting pools, retaining walls, boundary or claim markers, etc.)                                                                                                                                                               |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 2. Is the subject property or an adjacent property associated with a known architect or builder?                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 3. Is the subject property or an adjacent property associated with a person or event of historic interest?                                                                                                                                                                                                     |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 4. When the municipal heritage planner was contacted regarding potential cultural heritage value of the subject property, did they express interest or concern?                                                                                                                                                |
| <b>YES</b>               | <b>NO</b>                           | <b>Unknown</b>                      | <b>Cultural heritage landscapes</b>                                                                                                                                                                                                                                                                            |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 5. Does the subject property contain landscape features such as:                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Burial sites and/or cemeteries                                                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Parks or gardens                                                                                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Quarries, mining, industrial or farming operations                                                                                                                                                                                                                                                           |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Canals                                                                                                                                                                                                                                                                                                       |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Prominent natural features that could have special value to people (such as waterfalls, rocky outcrops, large specimen trees, caves, etc.)                                                                                                                                                                   |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Evidence of other human-made alterations to the natural landscape (such as trails, boundary or way-finding markers, mounds, earthworks, cultivation, non-native species, etc.)                                                                                                                               |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 6. Is the subject property within a Canadian Heritage River watershed?                                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 7. Is the subject property near the Rideau Canal Corridor UNESCO World Heritage Site?                                                                                                                                                                                                                          |
| <input type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | 8. Is there any evidence from documentary sources (e.g., local histories, a local recognition program, research studies, previous heritage impact assessment reports, etc.) or local knowledge or Aboriginal oral history, associating the subject property/ area with historic events, activities or persons? |

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**Note:**

If the answer is "yes" to any question in Step 1, proceed to Step 3.

The following resources can assist in answering questions in Step 1:

**Municipal Clerk or Planning Department** - Information on properties designated under the Ontario Heritage Act (individual properties or Heritage Conservation Districts) and properties listed on a Municipal Heritage register.

**Ontario Heritage Trust** - Contact the OHT directly regarding easement properties. A list of OHT plaques can be found on the website: [Ontario Heritage Trust](http://OntarioHeritageTrust.com)

**Parks Canada** - A list of National Historic Sites can be found on the website: [Parks Canada](http://ParksCanada.gc.ca)

**Ministry of Tourism and Culture** - The Ontario Heritage Properties Database includes close to 8000 identified heritage properties. Note while this database is a valuable resource, it has not been updated since 2005, and therefore is not comprehensive or exhaustive. [Ontario Heritage Properties Database](http://OntarioHeritagePropertiesDatabase.com)

**Local or Provincial archives**

**Local heritage organizations**, such as the municipal heritage committee, historical society, local branch of the Architectural Conservancy of Ontario, etc.

Consideration should also be given to obtaining oral evidence of CHRs. For example, in many Aboriginal communities, an important means of maintaining knowledge of cultural heritage resources is through oral tradition.

If the answer is "yes" to any question in Step 2, an evaluation of cultural heritage value is required. If cultural heritage resources are identified, proceed to Step 3.

If the answer to any question in Step 1 or to questions 2-4, 6-8 in Step 2, is "unknown", further research is required.

If the answer is "yes" to any of the questions in Step 3, a heritage impact assessment is required.

If uncertainty exists at any point, the services of a qualified person should be retained to assist in completing this checklist. All cultural heritage evaluation reports and heritage impact assessment reports must be prepared by a qualified person. Qualified persons means individuals (professional engineers, architects, archaeologists, etc.) having relevant, recent experience in the identification and conservation of cultural heritage resources. Appropriate evaluation involves gathering and recording information about the property sufficient to understand and substantiate its heritage value; determining cultural heritage value or interest based on the advice of qualified persons and with appropriate community input. If the property meets the criteria in Ontario Regulation 9/06 under the Ontario Heritage Act, it is a cultural heritage resource.

† The 40 year old threshold is an indicator of potential when conducting a preliminary survey for identification of cultural heritage resources. While the presence of a built feature that is 40 or more years old does not automatically signify cultural heritage value, it does make it more likely that the property could have cultural heritage value or interest. Similarly, if all the built features on a property are less than 40 years old, this does not automatically mean the property has no cultural heritage value. Note that age is not a criterion for designation under the *Ontario Heritage Act*.

**Step 3 – Screening for Potential Impacts**

| YES                                 | NO                                  | Will the proposed undertaking/project involve or result in any of the following potential impacts to the subject property or an adjacent* property?                             |
|-------------------------------------|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Destruction, removal or relocation</b> of any, or part of any, heritage attribute or feature.                                                                                |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <b>Alteration</b> (which means a change in any manner and includes restoration, renovation, repair or disturbance).                                                             |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Shadows</b> created that alter the appearance of a heritage attribute or change the exposure or visibility of a natural feature or plantings, such as a garden.              |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Isolation</b> of a heritage attribute from its surrounding environment, context or a significant relationship.                                                               |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Direct or indirect obstruction</b> of significant views or vistas from, within, or to a built or natural heritage feature.                                                   |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>A change in land use</b> such as rezoning a battlefield from open space to residential use, allowing new development or site alteration to fill in the formerly open spaces. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <b>Soil disturbance</b> such as a change in grade, or an alteration of the drainage pattern, or excavation, etc.                                                                |

\* For the purposes of evaluating potential impacts of development and site alteration "adjacent" means, contiguous properties as well as properties that are separated from a heritage property by narrow strip of land used as a public or private road, highway, street, lane, trail, right-of-way, walkway, green space, park, and/or easement or as otherwise defined in the municipal official plan.



## Screening for Impacts to Built Heritage and Cultural Heritage Landscapes

This checklist is intended to help proponents determine whether their project could affect known or potential cultural heritage resources. The completed checklist should be returned to the appropriate Heritage Planner or Heritage Advisor at the Ministry of Tourism and Culture.

### Step 1 – Screening for Recognized Cultural Heritage Value

| YES                      | NO                       | Unknown                  |                                                                                                                                         |
|--------------------------|--------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Is the subject property designated or adjacent* to a property designated under the <i>Ontario Heritage Act</i> ?                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Is the subject property listed on the municipal heritage register or a provincial register/list? (e.g. Ontario Heritage Bridge List) |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the subject property within or adjacent to a Heritage Conservation District?                                                      |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. Does the subject property have an Ontario Heritage Trust easement or is it adjacent to such a property?                              |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Is there a provincial or federal plaque on or near the subject property?                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Is the subject property a National Historic Site?                                                                                    |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Is the subject property recognized or valued by an Aboriginal community?                                                             |

### Step 2 – Screening Potential Resources

| YES                      | NO                       | Unknown                  |                                                                                                                                                                                                                                                                                                                |
|--------------------------|--------------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <b>Built heritage resources</b>                                                                                                                                                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Does the subject property or an adjacent property contain any buildings or structures <b>over forty years old</b> <sup>f</sup> that are:                                                                                                                                                                    |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Residential structures (e.g. house, apartment building, shanty or trap line shelter)                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Farm buildings (e.g. barns, outbuildings, silos, windmills)                                                                                                                                                                                                                                                  |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Industrial, commercial or institutional buildings (e.g. a factory, school, etc.)                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Engineering works (e.g. bridges, water or communications towers, roads, water/sewer systems, dams, earthworks, etc.)                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Monuments or Landmark Features (e.g. cairns, statues, obelisks, fountains, reflecting pools, retaining walls, boundary or claim markers, etc.)                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Is the subject property or an adjacent property associated with a known architect or builder?                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the subject property or an adjacent property associated with a person or event of historic interest?                                                                                                                                                                                                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. When the municipal heritage planner was contacted regarding potential cultural heritage value of the subject property, did they express interest or concern?                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <b>Cultural heritage landscapes</b>                                                                                                                                                                                                                                                                            |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Does the subject property contain landscape features such as:                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Burial sites and/or cemeteries                                                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Parks or gardens                                                                                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Quarries, mining, industrial or farming operations                                                                                                                                                                                                                                                           |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Canals                                                                                                                                                                                                                                                                                                       |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Prominent natural features that could have special value to people (such as waterfalls, rocky outcrops, large specimen trees, caves, etc.)                                                                                                                                                                   |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Evidence of other human-made alterations to the natural landscape (such as trails, boundary or way-finding markers, mounds, earthworks, cultivation, non-native species, etc.)                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Is the subject property within a Canadian Heritage River watershed?                                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Is the subject property near the Rideau Canal Corridor UNESCO World Heritage Site?                                                                                                                                                                                                                          |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 8. Is there any evidence from documentary sources (e.g., local histories, a local recognition program, research studies, previous heritage impact assessment reports, etc.) or local knowledge or Aboriginal oral history, associating the subject property/ area with historic events, activities or persons? |



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**Note:**

If the answer is "yes" to any question in Step 1, proceed to Step 3.

The following resources can assist in answering questions in Step 1:

**Municipal Clerk or Planning Department** – Information on properties designated under the Ontario Heritage Act (individual properties or Heritage Conservation Districts) and properties listed on a Municipal Heritage register.

**Ontario Heritage Trust** – Contact the OHT directly regarding easement properties. A list of OHT plaques can be found on the website: [Ontario Heritage Trust](http://OntarioHeritageTrust.com)

**Parks Canada** – A list of National Historic Sites can be found on the website: [Parks Canada](http://ParksCanada.gc.ca)

**Ministry of Tourism and Culture** – The Ontario Heritage Properties Database includes close to 8000 identified heritage properties. Note while this database is a valuable resource, it has not been updated since 2005, and therefore is not comprehensive or exhaustive. [Ontario Heritage Properties Database](http://OntarioHeritagePropertiesDatabase.com)

**Local or Provincial archives**

**Local heritage organizations**, such as the municipal heritage committee, historical society, local branch of the Architectural Conservancy of Ontario, etc.

Consideration should also be given to obtaining oral evidence of CHRs. For example, in many Aboriginal communities, an important means of maintaining knowledge of cultural heritage resources is through oral tradition.

If the answer is "yes" to any question in Step 2, an evaluation of cultural heritage value is required. If cultural heritage resources are identified, proceed to Step 3.

If the answer to any question in Step 1 or to questions 2-4, 6-8 in Step 2, is "unknown", further research is required.

If the answer is "yes" to any of the questions in Step 3, a heritage impact assessment is required.

If uncertainty exists at any point, the services of a qualified person should be retained to assist in completing this checklist. All cultural heritage evaluation reports and heritage impact assessment reports must be prepared by a qualified person. Qualified persons means individuals (professional engineers, architects, archaeologists, etc.) having relevant, recent experience in the identification and conservation of cultural heritage resources. Appropriate evaluation involves gathering and recording information about the property sufficient to understand and substantiate its heritage value; determining cultural heritage value or interest based on the advice of qualified persons and with appropriate community input. If the property meets the criteria in Ontario Regulation 9/06 under the Ontario Heritage Act, it is a cultural heritage resource.

<sup>†</sup> The 40 year old threshold is an indicator of potential when conducting a preliminary survey for identification of cultural heritage resources. While the presence of a built feature that is 40 or more years old does not automatically signify cultural heritage value, it does make it more likely that the property could have cultural heritage value or interest. Similarly, if all the built features on a property are less than 40 years old, this does not automatically mean the property has no cultural heritage value. Note that age is not a criterion for designation under the *Ontario Heritage Act*.

### Step 3 – Screening for Potential Impacts

| YES                                 | NO                                  | Will the proposed undertaking/project involve or result in any of the following potential impacts to the subject property or an adjacent* property?                             |
|-------------------------------------|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Destruction, removal or relocation</b> of any, or part of any, heritage attribute or feature.                                                                                |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <b>Alteration</b> (which means a change in any manner and includes restoration, renovation, repair or disturbance).                                                             |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Shadows</b> created that alter the appearance of a heritage attribute or change the exposure or visibility of a natural feature or plantings, such as a garden.              |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Isolation</b> of a heritage attribute from its surrounding environment, context or a significant relationship.                                                               |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Direct or indirect obstruction</b> of significant views or vistas from, within, or to a built or natural heritage feature.                                                   |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>A change in land use</b> such as rezoning a battlefield from open space to residential use, allowing new development or site alteration to fill in the formerly open spaces. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <b>Soil disturbance</b> such as a change in grade, or an alteration of the drainage pattern, or excavation, etc.                                                                |

\* For the purposes of evaluating potential impacts of development and site alteration "adjacent" means: contiguous properties as well as properties that are separated from a heritage property by narrow strip of land used as a public or private road, highway, street, lane, trail, right-of-way, walkway, green space, park, and/or easement or as otherwise defined in the municipal official plan.

## Screening for Impacts to Built Heritage and Cultural Heritage Landscapes

This checklist is intended to help proponents determine whether their project could affect known or potential cultural heritage resources. The completed checklist should be returned to the appropriate Heritage Planner or Heritage Advisor at the Ministry of Tourism and Culture.

### Step 1 – Screening for Recognized Cultural Heritage Value

| YES                      | NO                                  | Unknown                             |                                                                                                                                         |
|--------------------------|-------------------------------------|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 1. Is the subject property designated or adjacent* to a property designated under the <i>Ontario Heritage Act</i> ?                     |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 2. Is the subject property listed on the municipal heritage register or a provincial register/list? (e.g. Ontario Heritage Bridge List) |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 3. Is the subject property within or adjacent to a Heritage Conservation District?                                                      |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 4. Does the subject property have an Ontario Heritage Trust easement or is it adjacent to such a property?                              |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 5. Is there a provincial or federal plaque on or near the subject property?                                                             |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 6. Is the subject property a National Historic Site?                                                                                    |
| <input type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | 7. Is the subject property recognized or valued by an Aboriginal community?                                                             |

### Step 2 – Screening Potential Resources

| YES                      | NO                                  | Unknown                             |                                                                                                                                                                                                                                                                                                                |
|--------------------------|-------------------------------------|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <b>Built heritage resources</b>                                                                                                                                                                                                                                                                                |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 1. Does the subject property or an adjacent property contain any buildings or structures <b>over forty years old</b> <sup>†</sup> that are:                                                                                                                                                                    |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Residential structures (e.g. house, apartment building, shanty or trap line shelter)                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Farm buildings (e.g. barns, outbuildings, silos, windmills)                                                                                                                                                                                                                                                  |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Industrial, commercial or institutional buildings (e.g. a factory, school, etc.)                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Engineering works (e.g. bridges, water or communications towers, roads, water/sewer systems, dams, earthworks, etc.)                                                                                                                                                                                         |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Monuments or Landmark Features (e.g. cairns, statues, obelisks, fountains, reflecting pools, retaining walls, boundary or claim markers, etc.)                                                                                                                                                               |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 2. Is the subject property or an adjacent property associated with a known architect or builder?                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 3. Is the subject property or an adjacent property associated with a person or event of historic interest?                                                                                                                                                                                                     |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 4. When the municipal heritage planner was contacted regarding potential cultural heritage value of the subject property, did they express interest or concern?                                                                                                                                                |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <b>Cultural heritage landscapes</b>                                                                                                                                                                                                                                                                            |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 5. Does the subject property contain landscape features such as:                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Burial sites and/or cemeteries                                                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Parks or gardens                                                                                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Quarries, mining, industrial or farming operations                                                                                                                                                                                                                                                           |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Canals                                                                                                                                                                                                                                                                                                       |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Prominent natural features that could have special value to people (such as waterfalls, rocky outcrops, large specimen trees, caves, etc.)                                                                                                                                                                   |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Evidence of other human-made alterations to the natural landscape (such as trails, boundary or way-finding markers, mounds, earthworks, cultivation, non-native species, etc.)                                                                                                                               |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 6. Is the subject property within a Canadian Heritage River watershed?                                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 7. Is the subject property near the Rideau Canal Corridor UNESCO World Heritage Site?                                                                                                                                                                                                                          |
| <input type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | 8. Is there any evidence from documentary sources (e.g., local histories, a local recognition program, research studies, previous heritage impact assessment reports, etc.) or local knowledge or Aboriginal oral history, associating the subject property/ area with historic events, activities or persons? |



## Screening for Impacts to Built Heritage and Cultural Heritage Landscapes

This checklist is intended to help proponents determine whether their project could affect known or potential cultural heritage resources. The completed checklist should be returned to the appropriate Heritage Planner or Heritage Advisor at the Ministry of Tourism and Culture.

### Step 1 – Screening for Recognized Cultural Heritage Value

| YES                      | NO                       | Unknown                  |                                                                                                                                         |
|--------------------------|--------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Is the subject property designated or adjacent* to a property designated under the <i>Ontario Heritage Act</i> ?                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Is the subject property listed on the municipal heritage register or a provincial register/list? (e.g. Ontario Heritage Bridge List) |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the subject property within or adjacent to a Heritage Conservation District?                                                      |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. Does the subject property have an Ontario Heritage Trust easement or is it adjacent to such a property?                              |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Is there a provincial or federal plaque on or near the subject property?                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Is the subject property a National Historic Site?                                                                                    |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Is the subject property recognized or valued by an Aboriginal community?                                                             |

### Step 2 – Screening Potential Resources

| YES                      | NO                       | Unknown                  |                                                                                                                                                                                                                                                                                                                |
|--------------------------|--------------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <b>Built heritage resources</b>                                                                                                                                                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Does the subject property or an adjacent property contain any buildings or structures <b>over forty years old</b> <sup>†</sup> that are:                                                                                                                                                                    |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Residential structures (e.g. house, apartment building, shanty or trap line shelter)                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Farm buildings (e.g. barns, outbuildings, silos, windmills)                                                                                                                                                                                                                                                  |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Industrial, commercial or institutional buildings (e.g. a factory, school, etc.)                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Engineering works (e.g. bridges, water or communications towers, roads, water/sewer systems, dams, earthworks, etc.)                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Monuments or Landmark Features (e.g. cairns, statues, obelisks, fountains, reflecting pools, retaining walls, boundary or claim markers, etc.)                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Is the subject property or an adjacent property associated with a known architect or builder?                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the subject property or an adjacent property associated with a person or event of historic interest?                                                                                                                                                                                                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. When the municipal heritage planner was contacted regarding potential cultural heritage value of the subject property, did they express interest or concern?                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <b>Cultural heritage landscapes</b>                                                                                                                                                                                                                                                                            |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Does the subject property contain landscape features such as:                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Burial sites and/or cemeteries                                                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Parks or gardens                                                                                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Quarries, mining, industrial or farming operations                                                                                                                                                                                                                                                           |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Canals                                                                                                                                                                                                                                                                                                       |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Prominent natural features that could have special value to people (such as waterfalls, rocky outcrops, large specimen trees, caves, etc.)                                                                                                                                                                   |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Evidence of other human-made alterations to the natural landscape (such as trails, boundary or way-finding markers, mounds, earthworks, cultivation, non-native species, etc.)                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Is the subject property within a Canadian Heritage River watershed?                                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Is the subject property near the Rideau Canal Corridor UNESCO World Heritage Site?                                                                                                                                                                                                                          |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 8. Is there any evidence from documentary sources (e.g., local histories, a local recognition program, research studies, previous heritage impact assessment reports, etc.) or local knowledge or Aboriginal oral history, associating the subject property/ area with historic events, activities or persons? |



## Screening for Impacts to Built Heritage and Cultural Heritage Landscapes

This checklist is intended to help proponents determine whether their project could affect known or potential cultural heritage resources. The completed checklist should be returned to the appropriate Heritage Planner or Heritage Advisor at the Ministry of Tourism and Culture.

### Step 1 – Screening for Recognized Cultural Heritage Value

| YES                                 | NO                                  | Unknown                             |                                                                                                                                         |
|-------------------------------------|-------------------------------------|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 1. Is the subject property designated or adjacent* to a property designated under the <i>Ontario Heritage Act</i> ?                     |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | 2. Is the subject property listed on the municipal heritage register or a provincial register/list? (e.g. Ontario Heritage Bridge List) |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | 3. Is the subject property within or adjacent to a Heritage Conservation District?                                                      |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 4. Does the subject property have an Ontario Heritage Trust easement or is it adjacent to such a property?                              |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 5. Is there a provincial or federal plaque on or near the subject property?                                                             |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 6. Is the subject property a National Historic Site?                                                                                    |
| <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | 7. Is the subject property recognized or valued by an Aboriginal community?                                                             |

### Step 2 – Screening Potential Resources

| YES                                 | NO                                  | Unknown                             |                                                                                                                                                                                                                                                                                                                |
|-------------------------------------|-------------------------------------|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <b>Built heritage resources</b>                                                                                                                                                                                                                                                                                |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 1. Does the subject property or an adjacent property contain any buildings or structures <b>over forty years old</b> <sup>†</sup> that are:                                                                                                                                                                    |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Residential structures (e.g. house, apartment building, shanty or trap line shelter)                                                                                                                                                                                                                         |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Farm buildings (e.g. barns, outbuildings, silos, windmills)                                                                                                                                                                                                                                                  |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Industrial, commercial or institutional buildings (e.g. a factory, school, etc.)                                                                                                                                                                                                                             |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Engineering works (e.g. bridges, water or communications towers, roads, water/sewer systems, dams, earthworks, etc.)                                                                                                                                                                                         |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Monuments or Landmark Features (e.g. cairns, statues, obelisks, fountains, reflecting pools, retaining walls, boundary or claim markers, etc.)                                                                                                                                                               |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 2. Is the subject property or an adjacent property associated with a known architect or builder?                                                                                                                                                                                                               |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | 3. Is the subject property or an adjacent property associated with a person or event of historic interest?                                                                                                                                                                                                     |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | 4. When the municipal heritage planner was contacted regarding potential cultural heritage value of the subject property, did they express interest or concern?                                                                                                                                                |
| <b>YES</b>                          | <b>NO</b>                           | <b>Unknown</b>                      | <b>Cultural heritage landscapes</b>                                                                                                                                                                                                                                                                            |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 5. Does the subject property contain landscape features such as:                                                                                                                                                                                                                                               |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | ▪ Burial sites and/or cemeteries                                                                                                                                                                                                                                                                               |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Parks or gardens                                                                                                                                                                                                                                                                                             |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Quarries, mining, industrial or farming operations                                                                                                                                                                                                                                                           |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Canals                                                                                                                                                                                                                                                                                                       |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Prominent natural features that could have special value to people (such as waterfalls, rocky outcrops, large specimen trees, caves, etc.)                                                                                                                                                                   |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Evidence of other human-made alterations to the natural landscape (such as trails, boundary or way-finding markers, mounds, earthworks, cultivation, non-native species, etc.)                                                                                                                               |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 6. Is the subject property within a Canadian Heritage River watershed?                                                                                                                                                                                                                                         |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 7. Is the subject property near the Rideau Canal Corridor UNESCO World Heritage Site?                                                                                                                                                                                                                          |
| <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | 8. Is there any evidence from documentary sources (e.g., local histories, a local recognition program, research studies, previous heritage impact assessment reports, etc.) or local knowledge or Aboriginal oral history, associating the subject property/ area with historic events, activities or persons? |

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**Note:**

If the answer is "yes" to any question in Step 1, proceed to Step 3.

The following resources can assist in answering questions in Step 1:

**Municipal Clerk or Planning Department** - Information on properties designated under the Ontario Heritage Act (individual properties or Heritage Conservation Districts) and properties listed on a Municipal Heritage register.

**Ontario Heritage Trust** - Contact the OHT directly regarding assessment properties. A list of OHT pinquas can be found on the website: [Ontario Heritage Trust](#)

**Parks Canada** - A list of National Historic Sites can be found on the website: [Parks Canada](#)

**Ministry of Tourism and Culture** - The Ontario Heritage Properties Database includes close to 8000 identified heritage properties. Note while this database is a valuable resource, it has not been updated since 2005, and therefore is not comprehensive or exhaustive. [Ontario Heritage Properties Database](#)

**Local or Provincial archives**

**Local heritage organizations**, such as the municipal heritage committee, historical society, local branch of the Architectural Conservancy of Ontario, etc.

Consideration should also be given to obtaining oral evidence of CHRs. For example, in many Aboriginal communities, an important means of maintaining knowledge of cultural heritage resources is through oral tradition.

If the answer is "yes" to any question in Step 2, an evaluation of cultural heritage value is required. If cultural heritage resources are identified, proceed to Step 3.

If the answer to any question in Step 1 or to questions 2-4, 6-8 in Step 2, is "unknown", further research is required.

If the answer is "yes" to any of the questions in Step 3, a heritage impact assessment is required.

If uncertainty exists at any point, the services of a qualified person should be retained to assist in completing this checklist. All cultural heritage evaluation reports and heritage impact assessment reports must be prepared by a qualified person. Qualified persons means individuals (professional engineers, architects, archaeologists, etc.) having relevant, recent experience in the identification and conservation of cultural heritage resources. Appropriate evaluation involves gathering and recording information about the property sufficient to understand and substantiate its heritage value; determining cultural heritage value or interest based on the advice of qualified persons and with appropriate community input. If the property meets the criteria in Ontario Regulation 9/06 under the Ontario Heritage Act, it is a cultural heritage resource.

<sup>†</sup> The 40 year old threshold is an indicator of potential when conducting a preliminary survey for identification of cultural heritage resources. While the presence of a built feature that is 40 or more years old does not automatically signify cultural heritage value, it does make it more likely that the property could have cultural heritage value or interest. Similarly, if all the built features on a property are less than 40 years old, this does not automatically mean the property has no cultural heritage value. Note that age is not a criterion for designation under the Ontario Heritage Act.

### Step 3 – Screening for Potential Impacts

| YES                                 | NO                                  | Will the proposed undertaking/project involve or result in any of the following potential impacts to the subject property or an adjacent* property?                             |
|-------------------------------------|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Destruction, removal or relocation</b> of any, or part of any, heritage attribute or feature.                                                                                |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <b>Alteration</b> (which means a change in any manner and includes restoration, renovation, repair or disturbance).                                                             |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Shadows</b> created that alter the appearance of a heritage attribute or change the exposure or visibility of a natural feature or plantings, such as a garden.              |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Isolation</b> of a heritage attribute from its surrounding environment, context or a significant relationship.                                                               |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Direct or indirect obstruction</b> of significant views or vistas from, within, or to a built or natural heritage feature.                                                   |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>A change in land use</b> such as rezoning a battlefield from open space to residential use, allowing new development or site alteration to fill in the formerly open spaces. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <b>Soil disturbance</b> such as a change in grade, or an alteration of the drainage pattern, or excavation, etc.                                                                |

\* For the purposes of evaluating potential impacts of development and site alteration "adjacent" means: contiguous properties as well as properties that are separated from a heritage property by narrow strip of land used as a public or private road, highway, street, lane, trail, right-of-way, walkway, green space, park, and/or easement or as otherwise defined in the municipal official plan.



## Screening for Impacts to Built Heritage and Cultural Heritage Landscapes

This checklist is intended to help proponents determine whether their project could affect known or potential cultural heritage resources. The completed checklist should be returned to the appropriate Heritage Planner or Heritage Advisor at the Ministry of Tourism and Culture.

### Step 1 – Screening for Recognized Cultural Heritage Value

| YES                      | NO                       | Unknown                  |                                                                                                                                         |
|--------------------------|--------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Is the subject property designated or adjacent* to a property designated under the <i>Ontario Heritage Act</i> ?                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Is the subject property listed on the municipal heritage register or a provincial register/list? (e.g. Ontario Heritage Bridge List) |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the subject property within or adjacent to a Heritage Conservation District?                                                      |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. Does the subject property have an Ontario Heritage Trust easement or is it adjacent to such a property?                              |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Is there a provincial or federal plaque on or near the subject property?                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Is the subject property a National Historic Site?                                                                                    |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Is the subject property recognized or valued by an Aboriginal community?                                                             |

### Step 2 – Screening Potential Resources

| YES                      | NO                       | Unknown                  |                                                                                                                                                                                                                                                                                                                |
|--------------------------|--------------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                          |                          |                          | <b>Built heritage resources</b>                                                                                                                                                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Does the subject property or an adjacent property contain any buildings or structures <b>over forty years old</b> <sup>†</sup> that are:                                                                                                                                                                    |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Residential structures (e.g. house, apartment building, shanty or trap line shelter)                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Farm buildings (e.g. barns, outbuildings, silos, windmills)                                                                                                                                                                                                                                                  |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Industrial, commercial or institutional buildings (e.g. a factory, school, etc.)                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Engineering works (e.g. bridges, water or communications towers, roads, water/sewer systems, dams, earthworks, etc.)                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Monuments or Landmark Features (e.g. cairns, statues, obelisks, fountains, reflecting pools, retaining walls, boundary or claim markers, etc.)                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Is the subject property or an adjacent property associated with a known architect or builder?                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the subject property or an adjacent property associated with a person or event of historic interest?                                                                                                                                                                                                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. When the municipal heritage planner was contacted regarding potential cultural heritage value of the subject property, did they express interest or concern?                                                                                                                                                |
|                          |                          |                          | <b>Cultural heritage landscapes</b>                                                                                                                                                                                                                                                                            |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Does the subject property contain landscape features such as:                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Burial sites and/or cemeteries                                                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Parks or gardens                                                                                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Quarries, mining, industrial or farming operations                                                                                                                                                                                                                                                           |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Canals                                                                                                                                                                                                                                                                                                       |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Prominent natural features that could have special value to people (such as waterfalls, rocky outcrops, large specimen trees, caves, etc.)                                                                                                                                                                   |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Evidence of other human-made alterations to the natural landscape (such as trails, boundary or way-finding markers, mounds, earthworks, cultivation, non-native species, etc.)                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Is the subject property within a Canadian Heritage River watershed?                                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Is the subject property near the Rideau Canal Corridor UNESCO World Heritage Site?                                                                                                                                                                                                                          |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 8. Is there any evidence from documentary sources (e.g., local histories, a local recognition program, research studies, previous heritage impact assessment reports, etc.) or local knowledge or Aboriginal oral history, associating the subject property/ area with historic events, activities or persons? |



## Screening for Impacts to Built Heritage and Cultural Heritage Landscapes

This checklist is intended to help proponents determine whether their project could affect known or potential cultural heritage resources. The completed checklist should be returned to the appropriate Heritage Planner or Heritage Advisor at the Ministry of Tourism and Culture.

### Step 1 – Screening for Recognized Cultural Heritage Value

| YES                      | NO                                  | Unknown                             |                                                                                                                                         |
|--------------------------|-------------------------------------|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 1. Is the subject property designated or adjacent* to a property designated under the <i>Ontario Heritage Act</i> ?                     |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 2. Is the subject property listed on the municipal heritage register or a provincial register/list? (e.g. Ontario Heritage Bridge List) |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 3. Is the subject property within or adjacent to a Heritage Conservation District?                                                      |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 4. Does the subject property have an Ontario Heritage Trust easement or is it adjacent to such a property?                              |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 5. Is there a provincial or federal plaque on or near the subject property?                                                             |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 6. Is the subject property a National Historic Site?                                                                                    |
| <input type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | 7. Is the subject property recognized or valued by an Aboriginal community?                                                             |

### Step 2 – Screening Potential Resources

| YES                      | NO                                  | Unknown                             |                                                                                                                                                                                                                                                                                                                |
|--------------------------|-------------------------------------|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <b>Built heritage resources</b>                                                                                                                                                                                                                                                                                |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 1. Does the subject property or an adjacent property contain any buildings or structures <b>over forty years old</b> that are:                                                                                                                                                                                 |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Residential structures (e.g. house, apartment building, shanty or trap line shelter)                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Farm buildings (e.g. barns, outbuildings, silos, windmills)                                                                                                                                                                                                                                                  |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Industrial, commercial or institutional buildings (e.g. a factory, school, etc.)                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Engineering works (e.g. bridges, water or communications towers, roads, water/sewer systems, dams, earthworks, etc.)                                                                                                                                                                                         |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Monuments or Landmark Features (e.g. cairns, statues, obelisks, fountains, reflecting pools, retaining walls, boundary or claim markers, etc.)                                                                                                                                                               |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 2. Is the subject property or an adjacent property associated with a known architect or builder?                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 3. Is the subject property or an adjacent property associated with a person or event of historic interest?                                                                                                                                                                                                     |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 4. When the municipal heritage planner was contacted regarding potential cultural heritage value of the subject property, did they express interest or concern?                                                                                                                                                |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <b>Cultural heritage landscapes</b>                                                                                                                                                                                                                                                                            |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 5. Does the subject property contain landscape features such as:                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Burial sites and/or cemeteries                                                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Parks or gardens                                                                                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Quarries, mining, industrial or farming operations                                                                                                                                                                                                                                                           |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Canals                                                                                                                                                                                                                                                                                                       |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Prominent natural features that could have special value to people (such as waterfalls, rocky outcrops, large specimen trees, caves, etc.)                                                                                                                                                                   |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Evidence of other human-made alterations to the natural landscape (such as trails, boundary or way-finding markers, mounds, earthworks, cultivation, non-native species, etc.)                                                                                                                               |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 6. Is the subject property within a Canadian Heritage River watershed?                                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 7. Is the subject property near the Rideau Canal Corridor UNESCO World Heritage Site?                                                                                                                                                                                                                          |
| <input type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | 8. Is there any evidence from documentary sources (e.g., local histories, a local recognition program, research studies, previous heritage impact assessment reports, etc.) or local knowledge or Aboriginal oral history, associating the subject property/ area with historic events, activities or persons? |

## Screening for Impacts to Built Heritage and Cultural Heritage Landscapes

This checklist is intended to help proponents determine whether their project could affect known or potential cultural heritage resources. The completed checklist should be returned to the appropriate Heritage Planner or Heritage Advisor at the Ministry of Tourism and Culture.

### Step 1 – Screening for Recognized Cultural Heritage Value

| YES                      | NO                       | Unknown                  |                                                                                                                                         |
|--------------------------|--------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Is the subject property designated or adjacent* to a property designated under the <i>Ontario Heritage Act</i> ?                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Is the subject property listed on the municipal heritage register or a provincial register/list? (e.g. Ontario Heritage Bridge List) |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the subject property within or adjacent to a Heritage Conservation District?                                                      |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. Does the subject property have an Ontario Heritage Trust easement or is it adjacent to such a property?                              |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Is there a provincial or federal plaque on or near the subject property?                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Is the subject property a National Historic Site?                                                                                    |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Is the subject property recognized or valued by an Aboriginal community?                                                             |

### Step 2 – Screening Potential Resources

| YES                      | NO                       | Unknown                  |                                                                                                                                                                                                                                                                                                                |
|--------------------------|--------------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                          |                          |                          | <b>Built heritage resources</b>                                                                                                                                                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Does the subject property or an adjacent property contain any buildings or structures <b>over forty years old</b> <sup>†</sup> that are:                                                                                                                                                                    |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Residential structures (e.g. house, apartment building, shanty or trap line shelter)                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Farm buildings (e.g. barns, outbuildings, silos, windmills)                                                                                                                                                                                                                                                  |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Industrial, commercial or institutional buildings (e.g. a factory, school, etc.)                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Engineering works (e.g. bridges, water or communications towers, roads, water/sewer systems, dams, earthworks, etc.)                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Monuments or Landmark Features (e.g. cairns, statues, obelisks, fountains, reflecting pools, retaining walls, boundary or claim markers, etc.)                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Is the subject property or an adjacent property associated with a known architect or builder?                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the subject property or an adjacent property associated with a person or event of historic interest?                                                                                                                                                                                                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. When the municipal heritage planner was contacted regarding potential cultural heritage value of the subject property, did they express interest or concern?                                                                                                                                                |
|                          |                          |                          | <b>Cultural heritage landscapes</b>                                                                                                                                                                                                                                                                            |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Does the subject property contain landscape features such as:                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Burial sites and/or cemeteries                                                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Parks or gardens                                                                                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Quarries, mining, industrial or farming operations                                                                                                                                                                                                                                                           |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Canals                                                                                                                                                                                                                                                                                                       |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Prominent natural features that could have special value to people (such as waterfalls, rocky outcrops, large specimen trees, caves, etc.)                                                                                                                                                                   |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Evidence of other human-made alterations to the natural landscape (such as trails, boundary or way-finding markers, mounds, earthworks, cultivation, non-native species, etc.)                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Is the subject property within a Canadian Heritage River watershed?                                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Is the subject property near the Rideau Canal Corridor UNESCO World Heritage Site?                                                                                                                                                                                                                          |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 8. Is there any evidence from documentary sources (e.g., local histories, a local recognition program, research studies, previous heritage impact assessment reports, etc.) or local knowledge or Aboriginal oral history, associating the subject property/ area with historic events, activities or persons? |



## Screening for Impacts to Built Heritage and Cultural Heritage Landscapes

This checklist is intended to help proponents determine whether their project could affect known or potential cultural heritage resources. The completed checklist should be returned to the appropriate Heritage Planner or Heritage Advisor at the Ministry of Tourism and Culture.

### Step 1 – Screening for Recognized Cultural Heritage Value

| YES                                 | NO                                  | Unknown                             |                                                                                                                                         |
|-------------------------------------|-------------------------------------|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 1. Is the subject property designated or adjacent* to a property designated under the <i>Ontario Heritage Act</i> ?                     |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | 2. Is the subject property listed on the municipal heritage register or a provincial register/list? (e.g. Ontario Heritage Bridge List) |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | 3. Is the subject property within or adjacent to a Heritage Conservation District?                                                      |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 4. Does the subject property have an Ontario Heritage Trust easement or is it adjacent to such a property?                              |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 5. Is there a provincial or federal plaque on or near the subject property?                                                             |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 6. Is the subject property a National Historic Site?                                                                                    |
| <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | 7. Is the subject property recognized or valued by an Aboriginal community?                                                             |

### Step 2 – Screening Potential Resources

| YES                                 | NO                                  | Unknown                             |                                                                                                                                                                                                                                                                                                                |
|-------------------------------------|-------------------------------------|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <b>Built heritage resources</b>                                                                                                                                                                                                                                                                                |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 1. Does the subject property or an adjacent property contain any buildings or structures <b>over forty years old</b> <sup>†</sup> that are:                                                                                                                                                                    |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Residential structures (e.g. house, apartment building, shanty or trap line shelter)                                                                                                                                                                                                                         |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Farm buildings (e.g. barns, outbuildings, silos, windmills)                                                                                                                                                                                                                                                  |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Industrial, commercial or institutional buildings (e.g. a factory, school, etc.)                                                                                                                                                                                                                             |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Engineering works (e.g. bridges, water or communications towers, roads, water/sewer systems, dams, earthworks, etc.)                                                                                                                                                                                         |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Monuments or Landmark Features (e.g. cairns, statues, obelisks, fountains, reflecting pools, retaining walls, boundary or claim markers, etc.)                                                                                                                                                               |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 2. Is the subject property or an adjacent property associated with a known architect or builder?                                                                                                                                                                                                               |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | 3. Is the subject property or an adjacent property associated with a person or event of historic interest?                                                                                                                                                                                                     |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | 4. When the municipal heritage planner was contacted regarding potential cultural heritage value of the subject property, did they express interest or concern?                                                                                                                                                |
| <b>YES</b>                          | <b>NO</b>                           | <b>Unknown</b>                      | <b>Cultural heritage landscapes</b>                                                                                                                                                                                                                                                                            |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 5. Does the subject property contain landscape features such as:                                                                                                                                                                                                                                               |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | ▪ Burial sites and/or cemeteries                                                                                                                                                                                                                                                                               |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Parks or gardens                                                                                                                                                                                                                                                                                             |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Quarries, mining, industrial or farming operations                                                                                                                                                                                                                                                           |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Canals                                                                                                                                                                                                                                                                                                       |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Prominent natural features that could have special value to people (such as waterfalls, rocky outcrops, large specimen trees, caves, etc.)                                                                                                                                                                   |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Evidence of other human-made alterations to the natural landscape (such as trails, boundary or way-finding markers, mounds, earthworks, cultivation, non-native species, etc.)                                                                                                                               |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 6. Is the subject property within a Canadian Heritage River watershed?                                                                                                                                                                                                                                         |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 7. Is the subject property near the Rideau Canal Corridor UNESCO World Heritage Site?                                                                                                                                                                                                                          |
| <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | 8. Is there any evidence from documentary sources (e.g., local histories, a local recognition program, research studies, previous heritage impact assessment reports, etc.) or local knowledge or Aboriginal oral history, associating the subject property/ area with historic events, activities or persons? |



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**Note:**

If the answer is "yes" to any question in Step 1, proceed to Step 3.

The following resources can assist in answering questions in Step 1:

**Municipal Clerk or Planning Department** – Information on properties designated under the Ontario Heritage Act (individual properties or Heritage Conservation Districts) and properties listed on a Municipal Heritage register.

**Ontario Heritage Trust** – Contact the OHT directly regarding easement properties. A list of OHT plaques can be found on the website: [Ontario Heritage Trust](#)

**Parks Canada** – A list of National Historic Sites can be found on the website: [Parks Canada](#)

**Ministry of Tourism and Culture** – The Ontario Heritage Properties Database includes close to 8000 identified heritage properties. Note while this database is a valuable resource, it has not been updated since 2005, and therefore is not comprehensive or exhaustive. [Ontario Heritage Properties Database](#)

**Local or Provincial archives**

**Local heritage organizations**, such as the municipal heritage committee, historical society, local branch of the Architectural Conservancy of Ontario, etc.

Consideration should also be given to obtaining oral evidence of CHRs. For example, in many Aboriginal communities, an important means of maintaining knowledge of cultural heritage resources is through oral tradition.

If the answer is "yes" to any question in Step 2, an evaluation of cultural heritage value is required. If cultural heritage resources are identified, proceed to Step 3.

If the answer to any question in Step 1 or to questions 2-4, 6-8 in Step 2, is "unknown", further research is required.

If the answer is "yes" to any of the questions in Step 3, a heritage impact assessment is required.

If uncertainty exists at any point, the services of a qualified person should be retained to assist in completing this checklist. All cultural heritage evaluation reports and heritage impact assessment reports must be prepared by a qualified person. Qualified persons means individuals (professional engineers, architects, archaeologists, etc.) having relevant, recent experience in the identification and conservation of cultural heritage resources. Appropriate evaluation involves gathering and recording information about the property sufficient to understand and substantiate its heritage value; determining cultural heritage value or interest based on the advice of qualified persons and with appropriate community input. If the property meets the criteria in Ontario Regulation 9/06 under the Ontario Heritage Act, it is a cultural heritage resource.

† The 40 year old threshold is an indicator of potential when conducting a preliminary survey for identification of cultural heritage resources. While the presence of a built feature that is 40 or more years old does not automatically signify cultural heritage value, it does make it more likely that the property could have cultural heritage value or interest. Similarly, if all the built features on a property are less than 40 years old, this does not automatically mean the property has no cultural heritage value. Note that age is not a criterion for designation under the Ontario Heritage Act.

### Step 3 – Screening for Potential Impacts

| YES                                 | NO                                  | Will the proposed undertaking/project involve or result in any of the following potential impacts to the subject property or an adjacent* property?                             |
|-------------------------------------|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Destruction, removal or relocation</b> of any, or part of any, heritage attribute or feature.                                                                                |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <b>Alteration</b> (which means a change in any manner and includes restoration, renovation, repair or disturbance).                                                             |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Shadows</b> created that alter the appearance of a heritage attribute or change the exposure or visibility of a natural feature or plantings, such as a garden.              |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Isolation</b> of a heritage attribute from its surrounding environment, context or a significant relationship.                                                               |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Direct or indirect obstruction</b> of significant views or vistas from, within, or to a built or natural heritage feature.                                                   |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>A change in land use</b> such as rezoning a battlefield from open space to residential use, allowing new development or site alteration to fill in the formerly open spaces. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <b>Soil disturbance</b> such as a change in grade, or an alteration of the drainage pattern, or excavation, etc.                                                                |

\* For the purposes of evaluating potential impacts of development and site alteration "adjacent" means: contiguous properties as well as properties that are separated from a heritage property by narrow strip of land used as a public or private road, highway, street, lane, trail, right-of way, walkway, green space, park, and/or easement or as otherwise defined in the municipal official plan.

## Screening for Impacts to Built Heritage and Cultural Heritage Landscapes

This checklist is intended to help proponents determine whether their project could affect known or potential cultural heritage resources. The completed checklist should be returned to the appropriate Heritage Planner or Heritage Advisor at the Ministry of Tourism and Culture.

### Step 1 – Screening for Recognized Cultural Heritage Value

| YES                                 | NO                                  | Unknown                             |                                                                                                                                         |
|-------------------------------------|-------------------------------------|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 1. Is the subject property designated or adjacent* to a property designated under the <i>Ontario Heritage Act</i> ?                     |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | 2. Is the subject property listed on the municipal heritage register or a provincial register/list? (e.g. Ontario Heritage Bridge List) |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 3. Is the subject property within or adjacent to a Heritage Conservation District?                                                      |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 4. Does the subject property have an Ontario Heritage Trust easement or is it adjacent to such a property?                              |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 5. Is there a provincial or federal plaque on or near the subject property?                                                             |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 6. Is the subject property a National Historic Site?                                                                                    |
| <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | 7. Is the subject property recognized or valued by an Aboriginal community?                                                             |

### Step 2 – Screening Potential Resources

| YES                                 | NO                                  | Unknown                             |                                                                                                                                                                                                                                                                                                                |
|-------------------------------------|-------------------------------------|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <b>Built heritage resources</b>                                                                                                                                                                                                                                                                                |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 1. Does the subject property or an adjacent property contain any buildings or structures <b>over forty years old</b> <sup>†</sup> that are:                                                                                                                                                                    |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Residential structures (e.g. house, apartment building, shanty or trap line shelter)                                                                                                                                                                                                                         |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Farm buildings (e.g. barns, outbuildings, silos, windmills)                                                                                                                                                                                                                                                  |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Industrial, commercial or institutional buildings (e.g. a factory, school, etc.)                                                                                                                                                                                                                             |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Engineering works (e.g. bridges, water or communications towers, roads, water/sewer systems, dams, earthworks, etc.)                                                                                                                                                                                         |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Monuments or Landmark Features (e.g. cairns, statues, obelisks, fountains, reflecting pools, retaining walls, boundary or claim markers, etc.)                                                                                                                                                               |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 2. Is the subject property or an adjacent property associated with a known architect or builder?                                                                                                                                                                                                               |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | 3. Is the subject property or an adjacent property associated with a person or event of historic interest?                                                                                                                                                                                                     |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 4. When the municipal heritage planner was contacted regarding potential cultural heritage value of the subject property, did they express interest or concern?                                                                                                                                                |
| <b>YES</b>                          | <b>NO</b>                           | <b>Unknown</b>                      | <b>Cultural heritage landscapes</b>                                                                                                                                                                                                                                                                            |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 5. Does the subject property contain landscape features such as:                                                                                                                                                                                                                                               |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | ▪ Burial sites and/or cemeteries                                                                                                                                                                                                                                                                               |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Parks or gardens                                                                                                                                                                                                                                                                                             |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Quarries, mining, industrial or farming operations                                                                                                                                                                                                                                                           |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Canals                                                                                                                                                                                                                                                                                                       |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Prominent natural features that could have special value to people (such as waterfalls, rocky outcrops, large specimen trees, caves, etc.)                                                                                                                                                                   |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Evidence of other human-made alterations to the natural landscape (such as trails, boundary or way-finding markers, mounds, earthworks, cultivation, non-native species, etc.)                                                                                                                               |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 6. Is the subject property within a Canadian Heritage River watershed?                                                                                                                                                                                                                                         |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 7. Is the subject property near the Rideau Canal Corridor UNESCO World Heritage Site?                                                                                                                                                                                                                          |
| <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | 8. Is there any evidence from documentary sources (e.g., local histories, a local recognition program, research studies, previous heritage impact assessment reports, etc.) or local knowledge or Aboriginal oral history, associating the subject property/ area with historic events, activities or persons? |



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**Note:**

If the answer is "yes" to any question in Step 1, proceed to Step 3.

The following resources can assist in answering questions in Step 1:

**Municipal Clerk or Planning Department** -- Information on properties designated under the Ontario Heritage Act (individual properties or Heritage Conservation Districts) and properties listed on a Municipal Heritage register.

**Ontario Heritage Trust** -- Contact the OHT directly regarding easement properties. A list of OHT plaques can be found on the website: [Ontario Heritage Trust](http://OntarioHeritageTrust.com)

**Parks Canada** -- A list of National Historic Sites can be found on the website: [Parks Canada](http://ParksCanada.gc.ca)

**Ministry of Tourism and Culture** -- The Ontario Heritage Properties Database includes close to 8000 identified heritage properties. Note while this database is a valuable resource, it has not been updated since 2005, and therefore is not comprehensive or exhaustive. [Ontario Heritage Properties Database](http://OntarioHeritagePropertiesDatabase.com)

**Local or Provincial archives**

**Local heritage organizations**, such as the municipal heritage committee, historical society, local branch of the Architectural Conservancy of Ontario, etc.

Consideration should also be given to obtaining oral evidence of CHRs. For example, in many Aboriginal communities, an important means of maintaining knowledge of cultural heritage resources is through oral tradition.

If the answer is "yes" to any question in Step 2, an evaluation of cultural heritage value is required. If cultural heritage resources are identified, proceed to Step 3.

If the answer to any question in Step 1 or to questions 2-4, 6-8 in Step 2, is "unknown", further research is required.

If the answer is "yes" to any of the questions in Step 3, a heritage impact assessment is required.

If uncertainty exists at any point, the services of a qualified person should be retained to assist in completing this checklist. All cultural heritage evaluation reports and heritage impact assessment reports must be prepared by a qualified person. Qualified persons means individuals (professional engineers, architects, archaeologists, etc.) having relevant, recent experience in the identification and conservation of cultural heritage resources. Appropriate evaluation involves gathering and recording information about the property sufficient to understand and substantiate its heritage value; determining cultural heritage value or interest based on the advice of qualified persons and with appropriate community input. If the property meets the criteria in Ontario Regulation 9/06 under the Ontario Heritage Act, it is a cultural heritage resource.

<sup>†</sup> The 40 year old threshold is an indicator of potential when conducting a preliminary survey for identification of cultural heritage resources. While the presence of a built feature that is 40 or more years old does not automatically signify cultural heritage value, it does make it more likely that the property could have cultural heritage value or interest. Similarly, if all the built features on a property are less than 40 years old, this does not automatically mean the property has no cultural heritage value. Note that age is not a criterion for designation under the Ontario Heritage Act.

### Step 3 – Screening for Potential Impacts

| YES                                 | NO                                  | Will the proposed undertaking/project involve or result in any of the following potential impacts to the subject property or an adjacent* property?                             |
|-------------------------------------|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Destruction, removal or relocation</b> of any, or part of any, heritage attribute or feature.                                                                                |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <b>Alteration</b> (which means a change in any manner and includes restoration, renovation, repair or disturbance).                                                             |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Shadows</b> created that alter the appearance of a heritage attribute or change the exposure or visibility of a natural feature or plantings, such as a garden.              |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Isolation</b> of a heritage attribute from its surrounding environment, context or a significant relationship.                                                               |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Direct or indirect obstruction</b> of significant views or vistas from, within, or to a built or natural heritage feature.                                                   |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>A change in land use</b> such as rezoning a battlefield from open space to residential use, allowing new development or site alteration to fill in the formerly open spaces. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <b>Soil disturbance</b> such as a change in grade, or an alteration of the drainage pattern, or excavation, etc.                                                                |

\* For the purposes of evaluating potential impacts of development and site alteration "adjacent" means: contiguous properties as well as properties that are separated from a heritage property by narrow strip of land used as a public or private road, highway, street, lane, trail, right-of-way, walkway, green space, park, and/or easement or as otherwise defined in the municipal official plan.



## Screening for Impacts to Built Heritage and Cultural Heritage Landscapes

This checklist is intended to help proponents determine whether their project could affect known or potential cultural heritage resources. The completed checklist should be returned to the appropriate Heritage Planner or Heritage Advisor at the Ministry of Tourism and Culture.

### Step 1 – Screening for Recognized Cultural Heritage Value

| YES                                 | NO                                  | Unknown                             |                                                                                                                                         |
|-------------------------------------|-------------------------------------|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 1. Is the subject property designated or adjacent* to a property designated under the <i>Ontario Heritage Act</i> ?                     |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | 2. Is the subject property listed on the municipal heritage register or a provincial register/list? (e.g. Ontario Heritage Bridge List) |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 3. Is the subject property within or adjacent to a Heritage Conservation District?                                                      |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 4. Does the subject property have an Ontario Heritage Trust easement or is it adjacent to such a property?                              |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 5. Is there a provincial or federal plaque on or near the subject property?                                                             |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 6. Is the subject property a National Historic Site?                                                                                    |
| <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | 7. Is the subject property recognized or valued by an Aboriginal community?                                                             |

### Step 2 – Screening Potential Resources

| YES                                 | NO                                  | Unknown                             |                                                                                                                                                                                                                                                                                                                |
|-------------------------------------|-------------------------------------|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <b>Built heritage resources</b>                                                                                                                                                                                                                                                                                |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 1. Does the subject property or an adjacent property contain any buildings or structures <b>over forty years old</b> <sup>†</sup> that are:                                                                                                                                                                    |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Residential structures (e.g. house, apartment building, shanty or trap line shelter)                                                                                                                                                                                                                         |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Farm buildings (e.g. barns, outbuildings, silos, windmills)                                                                                                                                                                                                                                                  |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Industrial, commercial or institutional buildings (e.g. a factory, school, etc.)                                                                                                                                                                                                                             |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Engineering works (e.g. bridges, water or communications towers, roads, water/sewer systems, dams, earthworks, etc.)                                                                                                                                                                                         |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Monuments or Landmark Features (e.g. cairns, statues, obelisks, fountains, reflecting pools, retaining walls, boundary or claim markers, etc.)                                                                                                                                                               |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 2. Is the subject property or an adjacent property associated with a known architect or builder?                                                                                                                                                                                                               |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | 3. Is the subject property or an adjacent property associated with a person or event of historic interest?                                                                                                                                                                                                     |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 4. When the municipal heritage planner was contacted regarding potential cultural heritage value of the subject property, did they express interest or concern?                                                                                                                                                |
| <b>YES</b>                          | <b>NO</b>                           | <b>Unknown</b>                      | <b>Cultural heritage landscapes</b>                                                                                                                                                                                                                                                                            |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 5. Does the subject property contain landscape features such as:                                                                                                                                                                                                                                               |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | ▪ Burial sites and/or cemeteries                                                                                                                                                                                                                                                                               |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Parks or gardens                                                                                                                                                                                                                                                                                             |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Quarries, mining, industrial or farming operations                                                                                                                                                                                                                                                           |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Canals                                                                                                                                                                                                                                                                                                       |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Prominent natural features that could have special value to people (such as waterfalls, rocky outcrops, large specimen trees, caves, etc.)                                                                                                                                                                   |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Evidence of other human-made alterations to the natural landscape (such as trails, boundary or way-finding markers, mounds, earthworks, cultivation, non-native species, etc.)                                                                                                                               |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 6. Is the subject property within a Canadian Heritage River watershed?                                                                                                                                                                                                                                         |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 7. Is the subject property near the Rideau Canal Corridor UNESCO World Heritage Site?                                                                                                                                                                                                                          |
| <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | 8. Is there any evidence from documentary sources (e.g., local histories, a local recognition program, research studies, previous heritage impact assessment reports, etc.) or local knowledge or Aboriginal oral history, associating the subject property/ area with historic events, activities or persons? |

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**Note:**

If the answer is "yes" to any question in Step 1, proceed to Step 3.

The following resources can assist in answering questions in Step 1:

**Municipal Clerk or Planning Department** – Information on properties designated under the Ontario Heritage Act (individual properties or Heritage Conservation Districts) and properties listed on a Municipal Heritage register.

**Ontario Heritage Trust** – Contact the OHT directly regarding assessment properties. A list of OHT plaques can be found on the website: [OntarioHeritageTrust](http://OntarioHeritageTrust.com)

**Parks Canada** – A list of National Historic Sites can be found on the website: [Parks Canada](http://ParksCanada.com)

**Ministry of Tourism and Culture** – The Ontario Heritage Properties Database includes close to 8000 identified heritage properties. Note while this database is a valuable resource, it has not been updated since 2005, and therefore is not comprehensive or exhaustive. [OntarioHeritagePropertiesDatabase](http://OntarioHeritagePropertiesDatabase.com)

**Local or Provincial archives**

**Local heritage organizations**, such as the municipal heritage committee, historical society, local branch of the Architectural Conservancy of Ontario, etc.

Consideration should also be given to obtaining oral evidence of CHRs. For example, in many Aboriginal communities, an important means of maintaining knowledge of cultural heritage resources is through oral tradition.

If the answer is "yes" to any question in Step 2, an evaluation of cultural heritage value is required. If cultural heritage resources are identified, proceed to Step 3.

If the answer to any question in Step 1 or to questions 2-4, 6-8 in Step 2, is "unknown", further research is required.

If the answer is "yes" to any of the questions in Step 3, a heritage impact assessment is required.

If uncertainty exists at any point, the services of a qualified person should be retained to assist in completing this checklist. All cultural heritage evaluation reports and heritage impact assessment reports must be prepared by a qualified person. Qualified persons means individuals (professional engineers, architects, archaeologists, etc.) having relevant, recent experience in the identification and conservation of cultural heritage resources. Appropriate evaluation involves gathering and recording information about the property sufficient to understand and substantiate its heritage value; determining cultural heritage value or interest based on the advice of qualified persons and with appropriate community input. If the property meets the criteria in Ontario Regulation 9/06 under the Ontario Heritage Act, it is a cultural heritage resource.

† The 40 year old threshold is an indicator of potential when conducting a preliminary survey for identification of cultural heritage resources. While the presence of a built feature that is 40 or more years old does not automatically signify cultural heritage value, it does make it more likely that the property could have cultural heritage value or interest. Similarly, if all the built features on a property are less than 40 years old, this does not automatically mean the property has no cultural heritage value. Note that age is not a criterion for designation under the Ontario Heritage Act.

### Step 3 – Screening for Potential Impacts

| YES                                 | NO                                  | Will the proposed undertaking/project involve or result in any of the following potential impacts to the subject property or an adjacent* property?                             |
|-------------------------------------|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Destruction, removal or relocation</b> of any, or part of any, heritage attribute or feature.                                                                                |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <b>Alteration</b> (which means a change in any manner and includes restoration, renovation, repair or disturbance).                                                             |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Shadows</b> created that alter the appearance of a heritage attribute or change the exposure or visibility of a natural feature or plantings, such as a garden.              |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Isolation</b> of a heritage attribute from its surrounding environment, context or a significant relationship.                                                               |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Direct or indirect obstruction</b> of significant views or vistas from, within, or to a built or natural heritage feature.                                                   |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>A change in land use</b> such as rezoning a battlefield from open space to residential use, allowing new development or site alteration to fill in the formerly open spaces. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <b>Soil disturbance</b> such as a change in grade, or an alteration of the drainage pattern, or excavation, etc.                                                                |

\* For the purposes of evaluating potential impacts of development and site alteration "adjacent" means: contiguous properties as well as properties that are separated from a heritage property by narrow strip of land used as a public or private road, highway, street, lane, trail, right-of-way, walkway, green space, park, and/or easement or as otherwise defined in the municipal official plan.



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## Screening for Impacts to Built Heritage and Cultural Heritage Landscapes

This checklist is intended to help proponents determine whether their project could affect known or potential cultural heritage resources. The completed checklist should be returned to the appropriate Heritage Planner or Heritage Advisor at the Ministry of Tourism and Culture.

### Step 1 – Screening for Recognized Cultural Heritage Value

| YES                      | NO                       | Unknown                  |                                                                                                                                         |
|--------------------------|--------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Is the subject property designated or adjacent* to a property designated under the <i>Ontario Heritage Act</i> ?                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Is the subject property listed on the municipal heritage register or a provincial register/list? (e.g. Ontario Heritage Bridge List) |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the subject property within or adjacent to a Heritage Conservation District?                                                      |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. Does the subject property have an Ontario Heritage Trust easement or is it adjacent to such a property?                              |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Is there a provincial or federal plaque on or near the subject property?                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Is the subject property a National Historic Site?                                                                                    |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Is the subject property recognized or valued by an Aboriginal community?                                                             |

### Step 2 – Screening Potential Resources

| YES                      | NO                       | Unknown                  |                                                                                                                                                                                                                                                                                                                |
|--------------------------|--------------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <b>Built heritage resources</b>                                                                                                                                                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Does the subject property or an adjacent property contain any buildings or structures <b>over forty years old</b> <sup>†</sup> that are:                                                                                                                                                                    |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Residential structures (e.g. house, apartment building, shanty or trap line shelter)                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Farm buildings (e.g. barns, outbuildings, silos, windmills)                                                                                                                                                                                                                                                  |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Industrial, commercial or institutional buildings (e.g. a factory, school, etc.)                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Engineering works (e.g. bridges, water or communications towers, roads, water/sewer systems, dams, earthworks, etc.)                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Monuments or Landmark Features (e.g. cairns, statues, obelisks, fountains, reflecting pools, retaining walls, boundary or claim markers, etc.)                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Is the subject property or an adjacent property associated with a known architect or builder?                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the subject property or an adjacent property associated with a person or event of historic interest?                                                                                                                                                                                                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. When the municipal heritage planner was contacted regarding potential cultural heritage value of the subject property, did they express interest or concern?                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <b>Cultural heritage landscapes</b>                                                                                                                                                                                                                                                                            |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Does the subject property contain landscape features such as:                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Burial sites and/or cemeteries                                                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Parks or gardens                                                                                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Quarries, mining, industrial or farming operations                                                                                                                                                                                                                                                           |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Canals                                                                                                                                                                                                                                                                                                       |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Prominent natural features that could have special value to people (such as waterfalls, rocky outcrops, large specimen trees, caves, etc.)                                                                                                                                                                   |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Evidence of other human-made alterations to the natural landscape (such as trails, boundary or way-finding markers, mounds, earthworks, cultivation, non-native species, etc.)                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Is the subject property within a Canadian Heritage River watershed?                                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Is the subject property near the Rideau Canal Corridor UNESCO World Heritage Site?                                                                                                                                                                                                                          |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 8. Is there any evidence from documentary sources (e.g., local histories, a local recognition program, research studies, previous heritage impact assessment reports, etc.) or local knowledge or Aboriginal oral history, associating the subject property/ area with historic events, activities or persons? |



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**Note:**

If the answer is "yes" to any question in Step 1, proceed to Step 3.

The following resources can assist in answering questions in Step 1:

**Municipal Clerk or Planning Department** – Information on properties designated under the Ontario Heritage Act (individual properties or Heritage Conservation Districts) and properties listed on a Municipal Heritage register.

**Ontario Heritage Trust** – Contact the OHT directly regarding easement properties. A list of OHT plaques can be found on the website: [Ontario Heritage Trust](http://OntarioHeritageTrust.com)

**Parks Canada** – A list of National Historic Sites can be found on the website: [Parks Canada](http://ParksCanada.gc.ca)

**Ministry of Tourism and Culture** – The Ontario Heritage Properties Database includes close to 8000 identified heritage properties. Note while this database is a valuable resource, it has not been updated since 2005, and therefore is not comprehensive or exhaustive. [Ontario Heritage Properties Database](http://OntarioHeritagePropertiesDatabase.com)

**Local or Provincial archives**

**Local heritage organizations**, such as the municipal heritage committee, historical society, local branch of the Architectural Conservancy of Ontario, etc.

Consideration should also be given to obtaining oral evidence of CHRs. For example, in many Aboriginal communities, an important means of maintaining knowledge of cultural heritage resources is through oral tradition.

If the answer is "yes" to any question in Step 2, an evaluation of cultural heritage value is required. If cultural heritage resources are identified, proceed to Step 3.

If the answer to any question in Step 1 or to questions 2-4, 6-8 in Step 2, is "unknown", further research is required.

If the answer is "yes" to any of the questions in Step 3, a heritage impact assessment is required.

If uncertainty exists at any point, the services of a qualified person should be retained to assist in completing this checklist. All cultural heritage evaluation reports and heritage impact assessment reports must be prepared by a qualified person. Qualified persons means individuals (professional engineers, architects, archaeologists, etc.) having relevant, recent experience in the identification and conservation of cultural heritage resources. Appropriate evaluation involves gathering and recording information about the property sufficient to understand and substantiate its heritage value; determining cultural heritage value or interest based on the advice of qualified persons and with appropriate community input. If the property meets the criteria in Ontario Regulation 9/06 under the Ontario Heritage Act, it is a cultural heritage resource.

† The 40 year old threshold is an indicator of potential when conducting a preliminary survey for identification of cultural heritage resources. While the presence of a built feature that is 40 or more years old does not automatically signify cultural heritage value, it does make it more likely that the property could have cultural heritage value or interest. Similarly, if all the built features on a property are less than 40 years old, this does not automatically mean the property has no cultural heritage value. Note that age is not a criterion for designation under the Ontario Heritage Act.

### Step 3 – Screening for Potential Impacts

| YES                                 | NO                                  | Will the proposed undertaking/project involve or result in any of the following potential impacts to the subject property or an adjacent* property?                             |
|-------------------------------------|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Destruction, removal or relocation</b> of any, or part of any, heritage attribute or feature.                                                                                |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <b>Alteration</b> (which means a change in any manner and includes restoration, renovation, repair or disturbance).                                                             |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Shadows</b> created that alter the appearance of a heritage attribute or change the exposure or visibility of a natural feature or plantings, such as a garden.              |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Isolation</b> of a heritage attribute from its surrounding environment, context or a significant relationship.                                                               |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Direct or indirect obstruction</b> of significant views or vistas from, within, or to a built or natural heritage feature.                                                   |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>A change in land use</b> such as rezoning a battlefield from open space to residential use, allowing new development or site alteration to fill in the formerly open spaces. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <b>Soil disturbance</b> such as a change in grade, or an alteration of the drainage pattern, or excavation, etc.                                                                |

\* For the purposes of evaluating potential impacts of development and site alteration "adjacent" means: contiguous properties as well as properties that are separated from a heritage property by narrow strip of land used as a public or private road, highway, street, lane, trail, right-of-way, walkway, green space, park, and/or easement or as otherwise defined in the municipal official plan.

## Screening for Impacts to Built Heritage and Cultural Heritage Landscapes

This checklist is intended to help proponents determine whether their project could affect known or potential cultural heritage resources. The completed checklist should be returned to the appropriate Heritage Planner or Heritage Advisor at the Ministry of Tourism and Culture.

### Step 1 – Screening for Recognized Cultural Heritage Value

| YES                      | NO                       | Unknown                  |                                                                                                                                         |
|--------------------------|--------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Is the subject property designated or adjacent* to a property designated under the <i>Ontario Heritage Act</i> ?                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Is the subject property listed on the municipal heritage register or a provincial register/list? (e.g. Ontario Heritage Bridge List) |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the subject property within or adjacent to a Heritage Conservation District?                                                      |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. Does the subject property have an Ontario Heritage Trust easement or is it adjacent to such a property?                              |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Is there a provincial or federal plaque on or near the subject property?                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Is the subject property a National Historic Site?                                                                                    |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Is the subject property recognized or valued by an Aboriginal community?                                                             |

### Step 2 – Screening Potential Resources

| YES                      | NO                       | Unknown                  |                                                                                                                                                                                                                                                                                                                |
|--------------------------|--------------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <b>Built heritage resources</b>                                                                                                                                                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Does the subject property or an adjacent property contain any buildings or structures <b>over forty years old</b> <sup>†</sup> that are:                                                                                                                                                                    |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Residential structures (e.g. house, apartment building, shanty or trap line shelter)                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Farm buildings (e.g. barns, outbuildings, silos, windmills)                                                                                                                                                                                                                                                  |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Industrial, commercial or institutional buildings (e.g. a factory, school, etc.)                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Engineering works (e.g. bridges, water or communications towers, roads, water/sewer systems, dams, earthworks, etc.)                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Monuments or Landmark Features (e.g. cairns, statues, obelisks, fountains, reflecting pools, retaining walls, boundary or claim markers, etc.)                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Is the subject property or an adjacent property associated with a known architect or builder?                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the subject property or an adjacent property associated with a person or event of historic interest?                                                                                                                                                                                                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. When the municipal heritage planner was contacted regarding potential cultural heritage value of the subject property, did they express interest or concern?                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <b>Cultural heritage landscapes</b>                                                                                                                                                                                                                                                                            |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Does the subject property contain landscape features such as:                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Burial sites and/or cemeteries                                                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Parks or gardens                                                                                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Quarries, mining, industrial or farming operations                                                                                                                                                                                                                                                           |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Canals                                                                                                                                                                                                                                                                                                       |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Prominent natural features that could have special value to people (such as waterfalls, rocky outcrops, large specimen trees, caves, etc.)                                                                                                                                                                   |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Evidence of other human-made alterations to the natural landscape (such as trails, boundary or way-finding markers, mounds, earthworks, cultivation, non-native species, etc.)                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Is the subject property within a Canadian Heritage River watershed?                                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Is the subject property near the Rideau Canal Corridor UNESCO World Heritage Site?                                                                                                                                                                                                                          |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 8. Is there any evidence from documentary sources (e.g., local histories, a local recognition program, research studies, previous heritage impact assessment reports, etc.) or local knowledge or Aboriginal oral history, associating the subject property/ area with historic events, activities or persons? |



## Screening for Impacts to Built Heritage and Cultural Heritage Landscapes

This checklist is intended to help proponents determine whether their project could affect known or potential cultural heritage resources. The completed checklist should be returned to the appropriate Heritage Planner or Heritage Advisor at the Ministry of Tourism and Culture.

### Step 1 – Screening for Recognized Cultural Heritage Value

| YES                      | NO                       | Unknown                  |                                                                                                                                         |
|--------------------------|--------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Is the subject property designated or adjacent* to a property designated under the <i>Ontario Heritage Act</i> ?                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Is the subject property listed on the municipal heritage register or a provincial register/list? (e.g. Ontario Heritage Bridge List) |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the subject property within or adjacent to a Heritage Conservation District?                                                      |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. Does the subject property have an Ontario Heritage Trust easement or is it adjacent to such a property?                              |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Is there a provincial or federal plaque on or near the subject property?                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Is the subject property a National Historic Site?                                                                                    |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Is the subject property recognized or valued by an Aboriginal community?                                                             |

### Step 2 – Screening Potential Resources

| YES                      | NO                       | Unknown                  |                                                                                                                                                                                                                                                                                                                |
|--------------------------|--------------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <b>Built heritage resources</b>                                                                                                                                                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Does the subject property or an adjacent property contain any buildings or structures <b>over forty years old</b> <sup>†</sup> that are:                                                                                                                                                                    |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Residential structures (e.g. house, apartment building, shanty or trap line shelter)                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Farm buildings (e.g. barns, outbuildings, silos, windmills)                                                                                                                                                                                                                                                  |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Industrial, commercial or institutional buildings (e.g. a factory, school, etc.)                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Engineering works (e.g. bridges, water or communications towers, roads, water/sewer systems, dams, earthworks, etc.)                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Monuments or Landmark Features (e.g. cairns, statues, obelisks, fountains, reflecting pools, retaining walls, boundary or claim markers, etc.)                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Is the subject property or an adjacent property associated with a known architect or builder?                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the subject property or an adjacent property associated with a person or event of historic interest?                                                                                                                                                                                                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. When the municipal heritage planner was contacted regarding potential cultural heritage value of the subject property, did they express interest or concern?                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <b>Cultural heritage landscapes</b>                                                                                                                                                                                                                                                                            |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Does the subject property contain landscape features such as:                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Burial sites and/or cemeteries                                                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Parks or gardens                                                                                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Quarries, mining, industrial or farming operations                                                                                                                                                                                                                                                           |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Canals                                                                                                                                                                                                                                                                                                       |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Prominent natural features that could have special value to people (such as waterfalls, rocky outcrops, large specimen trees, caves, etc.)                                                                                                                                                                   |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Evidence of other human-made alterations to the natural landscape (such as trails, boundary or way-finding markers, mounds, earthworks, cultivation, non-native species, etc.)                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Is the subject property within a Canadian Heritage River watershed?                                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Is the subject property near the Rideau Canal Corridor UNESCO World Heritage Site?                                                                                                                                                                                                                          |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 8. Is there any evidence from documentary sources (e.g., local histories, a local recognition program, research studies, previous heritage impact assessment reports, etc.) or local knowledge or Aboriginal oral history, associating the subject property/ area with historic events, activities or persons? |



**Note:**

If the answer is "yes" to any question in Step 1, proceed to Step 3.

The following resources can assist in answering questions in Step 1.

**Municipal Clerk or Planning Department** – Information on properties designated under the Ontario Heritage Act (individual properties or Heritage Conservation Districts) and properties listed on a Municipal Heritage register.

**Ontario Heritage Trust** – Contact the OHT directly regarding easement properties. A list of OHT plaques can be found on the website: [OntarioHeritageTrust](http://OntarioHeritageTrust.com)

**Parks Canada** – A list of National Historic Sites can be found on the website: [ParksCanada](http://ParksCanada.com)

**Ministry of Tourism and Culture** – The Ontario Heritage Properties Database includes close to 8000 identified heritage properties. Note while this database is a valuable resource, it has not been updated since 2005, and therefore is not comprehensive or exhaustive. [OntarioHeritagePropertiesDatabase](http://OntarioHeritagePropertiesDatabase.com)

**Local or Provincial archives**

**Local heritage organizations**, such as the municipal heritage committee, historical society, local branch of the Architectural Conservancy of Ontario, etc.

Consideration should also be given to obtaining oral evidence of CHRs. For example, in many Aboriginal communities, an important means of maintaining knowledge of cultural heritage resources is through oral tradition.

If the answer is "yes" to any question in Step 2, an evaluation of cultural heritage value is required. If cultural heritage resources are identified, proceed to Step 3.

If the answer to any question in Step 1 or to questions 2-4, 6-8 in Step 2, is "unknown", further research is required.

If the answer is "yes" to any of the questions in Step 3, a heritage impact assessment is required.

If uncertainty exists at any point, the services of a qualified person should be retained to assist in completing this checklist. All cultural heritage evaluation reports and heritage impact assessment reports must be prepared by a qualified person. Qualified persons means individuals (professional engineers, architects, archaeologists, etc.) having relevant, recent experience in the identification and conservation of cultural heritage resources. Appropriate evaluation involves gathering and recording information about the property sufficient to understand and substantiate its heritage value; determining cultural heritage value or interest based on the advice of qualified persons and with appropriate community input. If the property meets the criteria in Ontario Regulation 9/06 under the Ontario Heritage Act, it is a cultural heritage resource.

<sup>†</sup> The 40 year old threshold is an indicator of potential when conducting a preliminary survey for identification of cultural heritage resources. While the presence of a built feature that is 40 or more years old does not automatically signify cultural heritage value, it does make it more likely that the property could have cultural heritage value or interest. Similarly, if all the built features on a property are less than 40 years old, this does not automatically mean the property has no cultural heritage value. Note that age is not a criterion for designation under the Ontario Heritage Act.

### Step 3 – Screening for Potential Impacts

| YES                                 | NO                                  | Will the proposed undertaking/project involve or result in any of the following potential impacts to the subject property or an adjacent* property?                             |
|-------------------------------------|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Destruction, removal or relocation</b> of any, or part of any, heritage attribute or feature.                                                                                |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <b>Alteration</b> (which means a change in any manner and includes restoration, renovation, repair or disturbance).                                                             |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Shadows</b> created that alter the appearance of a heritage attribute or change the exposure or visibility of a natural feature or plantings, such as a garden.              |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Isolation</b> of a heritage attribute from its surrounding environment, context or a significant relationship.                                                               |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Direct or indirect obstruction</b> of significant views or vistas from, within, or to a built or natural heritage feature.                                                   |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>A change in land use</b> such as rezoning a battlefield from open space to residential use, allowing new development or site alteration to fill in the formerly open spaces. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <b>Soil disturbance</b> such as a change in grade, or an alteration of the drainage pattern, or excavation, etc.                                                                |

\* For the purposes of evaluating potential impacts of development and site alteration "adjacent" means: contiguous properties as well as properties that are separated from a heritage property by narrow strip of land used as a public or private road, highway, street, lane, trail, right-of way, walkway, green space, park, and/or easement or as otherwise defined in the municipal official plan.

## Screening for Impacts to Built Heritage and Cultural Heritage Landscapes

This checklist is intended to help proponents determine whether their project could affect known or potential cultural heritage resources. The completed checklist should be returned to the appropriate Heritage Planner or Heritage Advisor at the Ministry of Tourism and Culture.

### Step 1 – Screening for Recognized Cultural Heritage Value

| YES                                 | NO                                  | Unknown                             |                                                                                                                                         |
|-------------------------------------|-------------------------------------|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | 1. Is the subject property designated or adjacent* to a property designated under the <i>Ontario Heritage Act</i> ?                     |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | 2. Is the subject property listed on the municipal heritage register or a provincial register/list? (e.g. Ontario Heritage Bridge List) |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | 3. Is the subject property within or adjacent to a Heritage Conservation District?                                                      |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 4. Does the subject property have an Ontario Heritage Trust easement or is it adjacent to such property?                                |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 5. Is there a provincial or federal plaque on or near the subject property?                                                             |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 6. Is the subject property a National Historic Site?                                                                                    |
| <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | 7. Is the subject property recognized or valued by an Aboriginal community?                                                             |

### Step 2 – Screening Potential Resources

| YES                                 | NO                                  | Unknown                             |                                                                                                                                                                                                                                                                                                                |
|-------------------------------------|-------------------------------------|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <b>Built heritage resources</b>                                                                                                                                                                                                                                                                                |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 1. Does the subject property or an adjacent property contain any buildings or structures <b>over forty years old</b> <sup>†</sup> that are:                                                                                                                                                                    |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Residential structures (e.g. house, apartment building, shanty or trap line shelter)                                                                                                                                                                                                                         |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Farm buildings (e.g. barns, outbuildings, silos, windmills)                                                                                                                                                                                                                                                  |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Industrial, commercial or institutional buildings (e.g. a factory, school, etc.)                                                                                                                                                                                                                             |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Engineering works (e.g. bridges, water or communications towers, roads, water/sewer systems, dams, earthworks, etc.)                                                                                                                                                                                         |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Monuments or Landmark Features (e.g. cairns, statues, obelisks, fountains, reflecting pools, retaining walls, boundary or claim markers, etc.)                                                                                                                                                               |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 2. Is the subject property or an adjacent property associated with a known architect or builder?                                                                                                                                                                                                               |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | 3. Is the subject property or an adjacent property associated with a person or event of historic interest?                                                                                                                                                                                                     |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | 4. When the municipal heritage planner was contacted regarding potential cultural heritage value of the subject property, did they express interest or concern?                                                                                                                                                |
| <b>YES</b>                          | <b>NO</b>                           | <b>Unknown</b>                      | <b>Cultural heritage landscapes</b>                                                                                                                                                                                                                                                                            |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 5. Does the subject property contain landscape features such as:                                                                                                                                                                                                                                               |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Burial sites and/or cemeteries                                                                                                                                                                                                                                                                               |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Parks or gardens                                                                                                                                                                                                                                                                                             |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Quarries, mining, industrial or farming operations                                                                                                                                                                                                                                                           |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Canals                                                                                                                                                                                                                                                                                                       |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Prominent natural features that could have special value to people (such as waterfalls, rocky outcrops, large specimen trees, caves, etc.)                                                                                                                                                                   |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Evidence of other human-made alterations to the natural landscape (such as trails, boundary or way-finding markers, mounds, earthworks, cultivation, non-native species, etc.)                                                                                                                               |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 6. Is the subject property within a Canadian Heritage River watershed?                                                                                                                                                                                                                                         |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 7. Is the subject property near the Rideau Canal Corridor UNESCO World Heritage Site?                                                                                                                                                                                                                          |
| <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | 8. Is there any evidence from documentary sources (e.g., local histories, a local recognition program, research studies, previous heritage impact assessment reports, etc.) or local knowledge or Aboriginal oral history, associating the subject property/ area with historic events, activities or persons? |



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**Note:**

If the answer is "yes" to any question in Step 1, proceed to Step 3.

The following resources can assist in answering questions in Step 1:

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**Local or Provincial archives**

**Local heritage organizations**, such as the municipal heritage committee, historical society, local branch of the Architectural Conservancy of Ontario, etc.

Consideration should also be given to obtaining oral evidence of CHRs. For example, in many Aboriginal communities, an important means of maintaining knowledge of cultural heritage resources is through oral tradition.

If the answer is "yes" to any question in Step 2, an evaluation of cultural heritage value is required. If cultural heritage resources are identified, proceed to Step 3.

If the answer to any question in Step 1 or to questions 2-4, 6-8 in Step 2, is "unknown", further research is required.

If the answer is "yes" to any of the questions in Step 3, a heritage impact assessment is required.

If uncertainty exists at any point, the services of a qualified person should be retained to assist in completing this checklist. All cultural heritage evaluation reports and heritage impact assessment reports must be prepared by a qualified person. Qualified persons means individuals (professional engineers, architects, archaeologists, etc.) having relevant, recent experience in the identification and conservation of cultural heritage resources. Appropriate evaluation involves gathering and recording information about the property sufficient to understand and substantiate its heritage value; determining cultural heritage value or interest based on the advice of qualified persons and with appropriate community input. If the property meets the criteria in Ontario Regulation 9/06 under the Ontario Heritage Act, it is a cultural heritage resource.

† The 40 year old threshold is an indicator of potential when conducting a preliminary survey for identification of cultural heritage resources. While the presence of a built feature that is 40 or more years old does not automatically signify cultural heritage value, it does make it more likely that the property could have cultural heritage value or interest. Similarly, if all the built features on a property are less than 40 years old, this does not automatically mean the property has no cultural heritage value. Note that age is not a criterion for designation under the Ontario Heritage Act.

### Step 3 – Screening for Potential Impacts

| YES                                 | NO                                  | Will the proposed undertaking/project involve or result in any of the following potential impacts to the subject property or an adjacent* property?                             |
|-------------------------------------|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Destruction, removal or relocation</b> of any, or part of any, heritage attribute or feature.                                                                                |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <b>Alteration</b> (which means a change in any manner and includes restoration, renovation, repair or disturbance).                                                             |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Shadows</b> created that alter the appearance of a heritage attribute or change the exposure or visibility of a natural feature or plantings, such as a garden.              |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Isolation</b> of a heritage attribute from its surrounding environment, context or a significant relationship.                                                               |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>Direct or indirect obstruction</b> of significant views or vistas from, within, or to a built or natural heritage feature.                                                   |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <b>A change in land use</b> such as rezoning a battlefield from open space to residential use, allowing new development or site alteration to fill in the formerly open spaces. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <b>Soil disturbance</b> such as a change in grade, or an alteration of the drainage pattern, or excavation, etc.                                                                |

\* For the purposes of evaluating potential impacts of development and site alteration "adjacent" means: contiguous properties as well as properties that are separated from a heritage property by narrow strip of land used as a public or private road, highway, street, lane, trail, right-of-way, walkway, green space, park, and/or easement or as otherwise defined in the municipal official plan.



## Screening for Impacts to Built Heritage and Cultural Heritage Landscapes

This checklist is intended to help proponents determine whether their project could affect known or potential cultural heritage resources. The completed checklist should be returned to the appropriate Heritage Planner or Heritage Advisor at the Ministry of Tourism and Culture.

### Step 1 – Screening for Recognized Cultural Heritage Value

| YES                                 | NO                                  | Unknown                             |                                                                                                                                         |
|-------------------------------------|-------------------------------------|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 1. Is the subject property designated or adjacent* to a property designated under the <i>Ontario Heritage Act</i> ?                     |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | 2. Is the subject property listed on the municipal heritage register or a provincial register/list? (e.g. Ontario Heritage Bridge List) |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 3. Is the subject property within or adjacent to a Heritage Conservation District?                                                      |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 4. Does the subject property have an Ontario Heritage Trust easement or is it adjacent to such property?                                |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 5. Is there a provincial or federal plaque on or near the subject property?                                                             |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 6. Is the subject property a National Historic Site?                                                                                    |
| <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | 7. Is the subject property recognized or valued by an Aboriginal community?                                                             |

### Step 2 – Screening Potential Resources

| YES                                 | NO                                  | Unknown                             |                                                                                                                                                                                                                                                                                                                |
|-------------------------------------|-------------------------------------|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                     |                                     |                                     | <b>Built heritage resources</b>                                                                                                                                                                                                                                                                                |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 1. Does the subject property or an adjacent property contain any buildings or structures <b>over forty years old</b> <sup>†</sup> that are:                                                                                                                                                                    |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Residential structures (e.g. house, apartment building, shanty or trap line shelter)                                                                                                                                                                                                                         |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Farm buildings (e.g. barns, outbuildings, silos, windmills)                                                                                                                                                                                                                                                  |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Industrial, commercial or institutional buildings (e.g. a factory, school, etc.)                                                                                                                                                                                                                             |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Engineering works (e.g. bridges, water or communications towers, roads, water/sewer systems, dams, earthworks, etc.)                                                                                                                                                                                         |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Monuments or Landmark Features (e.g. cairns, statues, obelisks, fountains, reflecting pools, retaining walls, boundary or claim markers, etc.)                                                                                                                                                               |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 2. Is the subject property or an adjacent property associated with a known architect or builder?                                                                                                                                                                                                               |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | 3. Is the subject property or an adjacent property associated with a person or event of historic interest?                                                                                                                                                                                                     |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 4. When the municipal heritage planner was contacted regarding potential cultural heritage value of the subject property, did they express interest or concern?                                                                                                                                                |
|                                     |                                     |                                     | <b>Cultural heritage landscapes</b>                                                                                                                                                                                                                                                                            |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 5. Does the subject property contain landscape features such as:                                                                                                                                                                                                                                               |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Burial sites and/or cemeteries                                                                                                                                                                                                                                                                               |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Parks or gardens                                                                                                                                                                                                                                                                                             |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Quarries, mining, industrial or farming operations                                                                                                                                                                                                                                                           |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Canals                                                                                                                                                                                                                                                                                                       |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Prominent natural features that could have special value to people (such as waterfalls, rocky outcrops, large specimen trees, caves, etc.)                                                                                                                                                                   |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | ▪ Evidence of other human-made alterations to the natural landscape (such as trails, boundary or way-finding markers, mounds, earthworks, cultivation, non-native species, etc.)                                                                                                                               |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 6. Is the subject property within a Canadian Heritage River watershed?                                                                                                                                                                                                                                         |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 7. Is the subject property near the Rideau Canal Corridor UNESCO World Heritage Site?                                                                                                                                                                                                                          |
| <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | 8. Is there any evidence from documentary sources (e.g., local histories, a local recognition program, research studies, previous heritage impact assessment reports, etc.) or local knowledge or Aboriginal oral history, associating the subject property/ area with historic events, activities or persons? |

**Note:**

If the answer is "yes" to any question in Step 1, proceed to Step 3.

The following resources can assist in answering questions in Step 1:

**Municipal Clerk or Planning Department** – Information on properties designated under the Ontario Heritage Act (individual properties or Heritage Conservation Districts) and properties listed on a Municipal Heritage register.

**Ontario Heritage Trust** – Contact the OHT directly regarding easement properties. A list of OHT plaques can be found on the website: [Ontario Heritage Trust](http://OntarioHeritageTrust.com)

**Parks Canada** – A list of National Historic Sites can be found on the website: [Parks Canada](http://ParksCanada.gc.ca)

**Ministry of Tourism and Culture** – The Ontario Heritage Properties Database includes close to 8000 identified heritage properties. Note while this database is a valuable resource, it has not been updated since 2005, and therefore is not comprehensive or exhaustive. [Ontario Heritage Properties Database](http://OntarioHeritagePropertiesDatabase.com)

**Local or Provincial archives**

**Local heritage organizations**, such as the municipal heritage committee, historical society, local branch of the Architectural Conservancy of Ontario, etc.

Consideration should also be given to obtaining oral evidence of CHRs. For example, in many Aboriginal communities, an important means of maintaining knowledge of cultural heritage resources is through oral tradition.

If the answer is "yes" to any question in Step 2, an evaluation of cultural heritage value is required. If cultural heritage resources are identified, proceed to Step 3.

If the answer to any question in Step 1 or to questions 2-4, 6-8 in Step 2, is "unknown", further research is required.

If the answer is "yes" to any of the questions in Step 3, a heritage impact assessment is required.

If uncertainty exists at any point, the services of a qualified person should be retained to assist in completing this checklist. All cultural heritage evaluation reports and heritage impact assessment reports must be prepared by a qualified person. Qualified persons means individuals (professional engineers, architects, archaeologists, etc.) having relevant, recent experience in the identification and conservation of cultural heritage resources. Appropriate evaluation involves gathering and recording information about the property sufficient to understand and substantiate its heritage value; determining cultural heritage value or interest based on the advice of qualified persons and with appropriate community input. If the property meets the criteria in Ontario Regulation 9/06 under the Ontario Heritage Act, it is a cultural heritage resource.

† The 40 year old threshold is an indicator of potential when conducting a preliminary survey for identification of cultural heritage resources. While the presence of a built feature that is 40 or more years old does not automatically signify cultural heritage value, it does make it more likely that the property could have cultural heritage value or interest. Similarly, if all the built features on a property are less than 40 years old, this does not automatically mean the property has no cultural heritage value. Note that age is not a criterion for designation under the Ontario Heritage Act.

### Step 3 – Screening for Potential Impacts

| YES                      | NO                       | Will the proposed undertaking/project involve or result in any of the following potential impacts to the subject property or an adjacent* property?                             |
|--------------------------|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <b>Destruction, removal or relocation</b> of any, or part of any, heritage attribute or feature.                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | <b>Alteration</b> (which means a change in any manner and includes restoration, renovation, repair or disturbance).                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <b>Shadows</b> created that alter the appearance of a heritage attribute or change the exposure or visibility of a natural feature or plantings, such as a garden.              |
| <input type="checkbox"/> | <input type="checkbox"/> | <b>Isolation</b> of a heritage attribute from its surrounding environment, context or a significant relationship.                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <b>Direct or indirect obstruction</b> of significant views or vistas from, within, or to a built or natural heritage feature.                                                   |
| <input type="checkbox"/> | <input type="checkbox"/> | <b>A change in land use</b> such as rezoning a battlefield from open space to residential use, allowing new development or site alteration to fill in the formerly open spaces. |
| <input type="checkbox"/> | <input type="checkbox"/> | <b>Soil disturbance</b> such as a change in grade, or an alteration of the drainage pattern, or excavation, etc.                                                                |

\* For the purposes of evaluating potential impacts of development and site alteration "adjacent" means: contiguous properties as well as properties that are separated from a heritage property by narrow strip of land used as a public or private road, highway, street, lane, trail, right-of-way, walkway, green space, park, and/or easement or as otherwise defined in the municipal official plan.



## Screening for Impacts to Built Heritage and Cultural Heritage Landscapes

This checklist is intended to help proponents determine whether their project could affect known or potential cultural heritage resources. The completed checklist should be returned to the appropriate Heritage Planner or Heritage Advisor at the Ministry of Tourism and Culture.

### Step 1 – Screening for Recognized Cultural Heritage Value

| YES                      | NO                       | Unknown                  |                                                                                                                                         |
|--------------------------|--------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Is the subject property designated or adjacent* to a property designated under the <i>Ontario Heritage Act</i> ?                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Is the subject property listed on the municipal heritage register or a provincial register/list? (e.g. Ontario Heritage Bridge List) |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the subject property within or adjacent to a Heritage Conservation District?                                                      |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. Does the subject property have an Ontario Heritage Trust easement or is it adjacent to such a property?                              |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Is there a provincial or federal plaque on or near the subject property?                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Is the subject property a National Historic Site?                                                                                    |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Is the subject property recognized or valued by an Aboriginal community?                                                             |

### Step 2 – Screening Potential Resources

| YES                      | NO                       | Unknown                  |                                                                                                                                                                                                                                                                                                                |
|--------------------------|--------------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                          |                          |                          | <b>Built heritage resources</b>                                                                                                                                                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Does the subject property or an adjacent property contain any buildings or structures <b>over forty years old</b> <sup>†</sup> that are:                                                                                                                                                                    |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Residential structures (e.g. house, apartment building, shanty or trap line shelter)                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Farm buildings (e.g. barns, outbuildings, silos, windmills)                                                                                                                                                                                                                                                  |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Industrial, commercial or institutional buildings (e.g. a factory, school, etc.)                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Engineering works (e.g. bridges, water or communications towers, roads, water/sewer systems, dams, earthworks, etc.)                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Monuments or Landmark Features (e.g. cairns, statues, obelisks, fountains, reflecting pools, retaining walls, boundary or claim markers, etc.)                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Is the subject property or an adjacent property associated with a known architect or builder?                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the subject property or an adjacent property associated with a person or event of historic interest?                                                                                                                                                                                                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. When the municipal heritage planner was contacted regarding potential cultural heritage value of the subject property, did they express interest or concern?                                                                                                                                                |
|                          |                          |                          | <b>Cultural heritage landscapes</b>                                                                                                                                                                                                                                                                            |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Does the subject property contain landscape features such as:                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Burial sites and/or cemeteries                                                                                                                                                                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Parks or gardens                                                                                                                                                                                                                                                                                             |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Quarries, mining, industrial or farming operations                                                                                                                                                                                                                                                           |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Canals                                                                                                                                                                                                                                                                                                       |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Prominent natural features that could have special value to people (such as waterfalls, rocky outcrops, large specimen trees, caves, etc.)                                                                                                                                                                   |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ▪ Evidence of other human-made alterations to the natural landscape (such as trails, boundary or way-finding markers, mounds, earthworks, cultivation, non-native species, etc.)                                                                                                                               |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Is the subject property within a Canadian Heritage River watershed?                                                                                                                                                                                                                                         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Is the subject property near the Rideau Canal Corridor UNESCO World Heritage Site?                                                                                                                                                                                                                          |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 8. Is there any evidence from documentary sources (e.g., local histories, a local recognition program, research studies, previous heritage impact assessment reports, etc.) or local knowledge or Aboriginal oral history, associating the subject property/ area with historic events, activities or persons? |



“Archaeological potential” is a term used to describe the likelihood that a property contains archaeological resources. This checklist is intended to assist non-specialists screening for the archaeological potential of a property where site alteration is proposed.

Note: for projects seeking a Renewable Energy Approval under Ontario Regulation 359/09, the Ministry of Tourism and Culture has developed a separate checklist to address the requirements of that regulation.

|                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------|
| Project Name<br><b>Markham Stormwater Management Facilities Retrofit Study Municipal Class Environmental Assessment</b> |
| Project Location<br><b>Pond 1</b>                                                                                       |
| Proponent Name<br><b>The City of Markham</b>                                                                            |
| Proponent Contact Information                                                                                           |

| Known Archaeological Sites                                                                                                                                                 | Yes                                 | Unknown                             | No                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 1. Known archaeological sites within 300 m of property                                                                                                                     | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| Physical Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 2. Body of water within 300 m of property<br>If yes, what kind of water?                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| a) Primary water source (lake, river, large creek, etc.)                                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| b) Secondary water source (stream, spring, marsh, swamp, etc.)                                                                                                             | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| c) Past water source (beach ridge, river bed, relic creek, ancient shoreline, etc.)                                                                                        | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 3. Topographical features on property<br>(knolls, drumlins, eskers, or plateaus)                                                                                           | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 4. Pockets of sandy soil (50 m <sup>2</sup> or larger) in a clay or rocky area on property                                                                                 | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 5. Distinctive land formations on property<br>(mounds, caverns, waterfalls, peninsulas, etc.)                                                                              | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Cultural Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 6. Known burial site or cemetery on or adjacent to the property<br>(cemetery is registered with the Cemeteries Regulation Unit)                                            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 7. Food or scarce resource harvest areas on property<br>(traditional fishing locations, agricultural/berry extraction areas, etc.)                                         | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 8. Indications of early Euro-Canadian settlement within 300 m of property<br>(monuments, cemeteries, structures, etc.)                                                     | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 9. Early historic transportation routes within 100 m of property<br>(historic road, trail, portage, rail corridor, etc.)                                                   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Property-specific Information                                                                                                                                              | Yes                                 | Unknown                             | No                                  |
| 10. Property is designated and/or listed under the <i>Ontario Heritage Act</i><br>(municipal register and lands described in Reg. 875 of the <i>Ontario Heritage Act</i> ) | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 11. Local knowledge of archaeological potential of property<br>(from aboriginal communities, heritage organisations, municipal heritage committees, etc.)                  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 12. Recent deep ground disturbance <sup>†</sup><br>(post-1960, widespread and deep land alterations)                                                                       | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |

<sup>†</sup> Archaeological potential can be determined not to be present for either the entire property or a part(s) of it when the area under consideration has been subject to widespread and deep land alterations that have severely damaged the integrity of any archaeological resources. Deep disturbance may include quarrying or major underground infrastructure development. Activities such as agricultural cultivation, gardening, minor grading and landscaping are not necessarily considered deep disturbance. Alterations can be considered to be extensive or widespread when they have affected a large area, usually defined as the majority of a property.

**Scoring the results:**

|                                                                   |                                                                    |
|-------------------------------------------------------------------|--------------------------------------------------------------------|
| If <b>Yes</b> to <b>any</b> of <b>1, 2a, 2b, 2c, 6, 10, or 11</b> | → high archaeological potential – assessment is required           |
| If <b>Yes</b> to <b>two or more</b> of <b>3, 4, 5, 7, 8, or 9</b> | → high archaeological potential – assessment is required           |
| If <b>Yes</b> to <b>12</b> or <b>No</b> to all of <b>1 - 10</b>   | → <b>low</b> archaeological potential – assessment is not required |
| If 3 or more <b>Unknown</b>                                       | → an archaeological assessment is required (see note below)        |

<sup>†</sup> **Note:** If information requested in this checklist is unknown, a consultant archaeologist licensed under the *Ontario Heritage Act* should be retained to carry out at least a Stage 1 archaeological assessment to further explore the archaeological potential of the property and to prepare a report on the results of that assessment. The Ministry of Tourism and Culture reviews all such reports prepared by consultant archaeologists against the ministry's Standards and Guidelines for Consultant Archaeologists. Once the ministry is satisfied that, based on the available information, the report has been prepared in accordance with those guidelines, the ministry issues an acceptance letter to the consultant archaeologist and places the report into its registry where it is available for public inspection.

“Archaeological potential” is a term used to describe the likelihood that a property contains archaeological resources. This checklist is intended to assist non-specialists screening for the archaeological potential of a property where site alteration is proposed.

Note: for projects seeking a Renewable Energy Approval under Ontario Regulation 359/09, the Ministry of Tourism and Culture has developed a separate checklist to address the requirements of that regulation.

|                               |                                                                                                         |
|-------------------------------|---------------------------------------------------------------------------------------------------------|
| Project Name                  | <b>Markham Stormwater Management Facilities Retrofit Study Municipal Class Environmental Assessment</b> |
| Project Location              | <b>Pond 4</b>                                                                                           |
| Proponent Name                | <b>The City of Markham</b>                                                                              |
| Proponent Contact Information |                                                                                                         |

| Known Archaeological Sites                                                                                                                                                 | Yes                                 | Unknown                             | No                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 1. Known archaeological sites within 300 m of property                                                                                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Physical Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 2. Body of water within 300 m of property<br>If yes, what kind of water?                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| a) Primary water source (lake, river, large creek, etc.)                                                                                                                   | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| b) Secondary water source (stream, spring, marsh, swamp, etc.)                                                                                                             | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| c) Past water source (beach ridge, river bed, relic creek, ancient shoreline, etc.)                                                                                        | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 3. Topographical features on property<br>(knolls, drumlins, eskers, or plateaus)                                                                                           | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 4. Pockets of sandy soil (50 m <sup>2</sup> or larger) in a clay or rocky area on property                                                                                 | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 5. Distinctive land formations on property<br>(mounds, caverns, waterfalls, peninsulas, etc.)                                                                              | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Cultural Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 6. Known burial site or cemetery on or adjacent to the property<br>(cemetery is registered with the Cemeteries Regulation Unit)                                            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 7. Food or scarce resource harvest areas on property<br>(traditional fishing locations, agricultural/berry extraction areas, etc.)                                         | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 8. Indications of early Euro-Canadian settlement within 300 m of property<br>(monuments, cemeteries, structures, etc.)                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 9. Early historic transportation routes within 100 m of property<br>(historic road, trail, portage, rail corridor, etc.)                                                   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Property-specific Information                                                                                                                                              | Yes                                 | Unknown                             | No                                  |
| 10. Property is designated and/or listed under the <i>Ontario Heritage Act</i><br>(municipal register and lands described in Reg. 875 of the <i>Ontario Heritage Act</i> ) | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 11. Local knowledge of archaeological potential of property<br>(from aboriginal communities, heritage organisations, municipal heritage committees, etc.)                  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 12. Recent deep ground disturbance <sup>†</sup><br>(post-1960, widespread and deep land alterations)                                                                       | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |

<sup>†</sup> Archaeological potential can be determined not to be present for either the entire property or a part(s) of it when the area under consideration has been subject to widespread and deep land alterations that have severely damaged the integrity of any archaeological resources. Deep disturbance may include quarrying or major underground infrastructure development. Activities such as agricultural cultivation, gardening, minor grading and landscaping are not necessarily considered deep disturbance. Alterations can be considered to be extensive or widespread when they have affected a large area, usually defined as the majority of a property.



“Archaeological potential” is a term used to describe the likelihood that a property contains archaeological resources. This checklist is intended to assist non-specialists screening for the archaeological potential of a property where site alteration is proposed.

Note: for projects seeking a Renewable Energy Approval under Ontario Regulation 359/09, the Ministry of Tourism and Culture has developed a separate checklist to address the requirements of that regulation.

|                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------|
| Project Name<br><b>Markham Stormwater Management Facilities Retrofit Study Municipal Class Environmental Assessment</b> |
| Project Location<br><b>Pond 5</b>                                                                                       |
| Proponent Name<br><b>The City of Markham</b>                                                                            |
| Proponent Contact Information                                                                                           |

| Known Archaeological Sites                                                                                                                                                 | Yes                                 | Unknown                             | No                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 1. Known archaeological sites within 300 m of property                                                                                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Physical Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 2. Body of water within 300 m of property<br>If yes, what kind of water?                                                                                                   | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| a) Primary water source (lake, river, large creek, etc.)                                                                                                                   | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| b) Secondary water source (stream, spring, marsh, swamp, etc.)                                                                                                             | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| c) Past water source (beach ridge, river bed, relic creek, ancient shoreline, etc.)                                                                                        | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 3. Topographical features on property<br>(knolls, drumlins, eskers, or plateaus)                                                                                           | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 4. Pockets of sandy soil (50 m <sup>2</sup> or larger) in a clay or rocky area on property                                                                                 | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 5. Distinctive land formations on property<br>(mounds, caverns, waterfalls, peninsulas, etc.)                                                                              | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Cultural Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 6. Known burial site or cemetery on or adjacent to the property<br>(cemetery is registered with the Cemeteries Regulation Unit)                                            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 7. Food or scarce resource harvest areas on property<br>(traditional fishing locations, agricultural/berry extraction areas, etc.)                                         | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 8. Indications of early Euro-Canadian settlement within 300 m of property<br>(monuments, cemeteries, structures, etc.)                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 9. Early historic transportation routes within 100 m of property<br>(historic road, trail, portage, rail corridor, etc.)                                                   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Property-specific Information                                                                                                                                              | Yes                                 | Unknown                             | No                                  |
| 10. Property is designated and/or listed under the <i>Ontario Heritage Act</i><br>(municipal register and lands described in Reg. 875 of the <i>Ontario Heritage Act</i> ) | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 11. Local knowledge of archaeological potential of property<br>(from aboriginal communities, heritage organisations, municipal heritage committees, etc.)                  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 12. Recent deep ground disturbance <sup>†</sup><br>(post-1960, widespread and deep land alterations)                                                                       | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |

<sup>†</sup> Archaeological potential can be determined not to be present for either the entire property or a part(s) of it when the area under consideration has been subject to widespread and deep land alterations that have severely damaged the integrity of any archaeological resources. Deep disturbance may include quarrying or major underground infrastructure development. Activities such as agricultural cultivation, gardening, minor grading and landscaping are not necessarily considered deep disturbance. Alterations can be considered to be extensive or widespread when they have affected a large area, usually defined as the majority of a property.

“Archaeological potential” is a term used to describe the likelihood that a property contains archaeological resources. This checklist is intended to assist non-specialists screening for the archaeological potential of a property where site alteration is proposed.

Note: for projects seeking a Renewable Energy Approval under Ontario Regulation 359/09, the Ministry of Tourism and Culture has developed a separate checklist to address the requirements of that regulation.

|                               |                                                                                                         |
|-------------------------------|---------------------------------------------------------------------------------------------------------|
| Project Name                  | <b>Markham Stormwater Management Facilities Retrofit Study Municipal Class Environmental Assessment</b> |
| Project Location              | <b>Pond 6</b>                                                                                           |
| Proponent Name                | <b>The City of Markham</b>                                                                              |
| Proponent Contact Information |                                                                                                         |

| Known Archaeological Sites                             | Yes                      | Unknown                  | No                                  |
|--------------------------------------------------------|--------------------------|--------------------------|-------------------------------------|
| 1. Known archaeological sites within 300 m of property | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

| Physical Features                                                                             | Yes                      | Unknown                  | No                                  |
|-----------------------------------------------------------------------------------------------|--------------------------|--------------------------|-------------------------------------|
| 2. Body of water within 300 m of property<br>If yes, what kind of water?                      | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| a) Primary water source (lake, river, large creek, etc.)                                      | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| b) Secondary water source (stream, spring, marsh, swamp, etc.)                                | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| c) Past water source (beach ridge, river bed, relic creek, ancient shoreline, etc.)           | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3. Topographical features on property<br>(knolls, drumlins, eskers, or plateaus)              | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 4. Pockets of sandy soil (50 m <sup>2</sup> or larger) in a clay or rocky area on property    | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 5. Distinctive land formations on property<br>(mounds, caverns, waterfalls, peninsulas, etc.) | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

| Cultural Features                                                                                                                  | Yes                      | Unknown                             | No                                  |
|------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-------------------------------------|-------------------------------------|
| 6. Known burial site or cemetery on or adjacent to the property<br>(cemetery is registered with the Cemeteries Regulation Unit)    | <input type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 7. Food or scarce resource harvest areas on property<br>(traditional fishing locations, agricultural/berry extraction areas, etc.) | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 8. Indications of early Euro-Canadian settlement within 300 m of property<br>(monuments, cemeteries, structures, etc.)             | <input type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 9. Early historic transportation routes within 100 m of property<br>(historic road, trail, portage, rail corridor, etc.)           | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |

| Property-specific Information                                                                                                                                              | Yes                                 | Unknown                             | No                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 10. Property is designated and/or listed under the <i>Ontario Heritage Act</i><br>(municipal register and lands described in Reg. 875 of the <i>Ontario Heritage Act</i> ) | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 11. Local knowledge of archaeological potential of property<br>(from aboriginal communities, heritage organisations, municipal heritage committees, etc.)                  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 12. Recent deep ground disturbance <sup>†</sup><br>(post-1960, widespread and deep land alterations)                                                                       | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |

<sup>†</sup> Archaeological potential can be determined not to be present for either the entire property or a part(s) of it when the area under consideration has been subject to widespread and deep land alterations that have severely damaged the integrity of any archaeological resources. Deep disturbance may include quarrying or major underground infrastructure development. Activities such as agricultural cultivation, gardening, minor grading and landscaping are not necessarily considered deep disturbance. Alterations can be considered to be extensive or widespread when they have affected a large area, usually defined as the majority of a property.

“Archaeological potential” is a term used to describe the likelihood that a property contains archaeological resources. This checklist is intended to assist non-specialists screening for the archaeological potential of a property where site alteration is proposed.

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|                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------|
| Project Name<br><b>Markham Stormwater Management Facilities Retrofit Study Municipal Class Environmental Assessment</b> |
| Project Location<br><b>Pond 8</b>                                                                                       |
| Proponent Name<br><b>The City of Markham</b>                                                                            |
| Proponent Contact Information                                                                                           |

| Known Archaeological Sites                                                                                                                                                 | Yes                                 | Unknown                             | No                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 1. Known archaeological sites within 300 m of property                                                                                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Physical Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 2. Body of water within 300 m of property<br>If yes, what kind of water?                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| a) Primary water source (lake, river, large creek, etc.)                                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| b) Secondary water source (stream, spring, marsh, swamp, etc.)                                                                                                             | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| c) Past water source (beach ridge, river bed, relic creek, ancient shoreline, etc.)                                                                                        | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 3. Topographical features on property<br>(knolls, drumlins, eskers, or plateaus)                                                                                           | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 4. Pockets of sandy soil (50 m <sup>2</sup> or larger) in a clay or rocky area on property                                                                                 | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 5. Distinctive land formations on property<br>(mounds, caverns, waterfalls, peninsulas, etc.)                                                                              | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Cultural Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 6. Known burial site or cemetery on or adjacent to the property<br>(cemetery is registered with the Cemeteries Regulation Unit)                                            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 7. Food or scarce resource harvest areas on property<br>(traditional fishing locations, agricultural/berry extraction areas, etc.)                                         | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 8. Indications of early Euro-Canadian settlement within 300 m of property<br>(monuments, cemeteries, structures, etc.)                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 9. Early historic transportation routes within 100 m of property<br>(historic road, trail, portage, rail corridor, etc.)                                                   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Property-specific Information                                                                                                                                              | Yes                                 | Unknown                             | No                                  |
| 10. Property is designated and/or listed under the <i>Ontario Heritage Act</i><br>(municipal register and lands described in Reg. 875 of the <i>Ontario Heritage Act</i> ) | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 11. Local knowledge of archaeological potential of property<br>(from aboriginal communities, heritage organisations, municipal heritage committees, etc.)                  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 12. Recent deep ground disturbance <sup>†</sup><br>(post-1960, widespread and deep land alterations)                                                                       | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |

<sup>†</sup> Archaeological potential can be determined not to be present for either the entire property or a part(s) of it when the area under consideration has been subject to widespread and deep land alterations that have severely damaged the integrity of any archaeological resources. Deep disturbance may include quarrying or major underground infrastructure development. Activities such as agricultural cultivation, gardening, minor grading and landscaping are not necessarily considered deep disturbance. Alterations can be considered to be extensive or widespread when they have affected a large area, usually defined as the majority of a property.



“Archaeological potential” is a term used to describe the likelihood that a property contains archaeological resources. This checklist is intended to assist non-specialists screening for the archaeological potential of a property where site alteration is proposed.

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|                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------|
| Project Name<br><b>Markham Stormwater Management Facilities Retrofit Study Municipal Class Environmental Assessment</b> |
| Project Location<br><b>Pond 11</b>                                                                                      |
| Proponent Name<br><b>The City of Markham</b>                                                                            |
| Proponent Contact Information                                                                                           |

| Known Archaeological Sites                                                                                                                                                 | Yes                                 | Unknown                             | No                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 1. Known archaeological sites within 300 m of property                                                                                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Physical Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 2. Body of water within 300 m of property<br>If yes, what kind of water?                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| a) Primary water source (lake, river, large creek, etc.)                                                                                                                   | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| b) Secondary water source (stream, spring, marsh, swamp, etc.)                                                                                                             | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| c) Past water source (beach ridge, river bed, relic creek, ancient shoreline, etc.)                                                                                        | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 3. Topographical features on property<br>(knolls, drumlins, eskers, or plateaus)                                                                                           | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 4. Pockets of sandy soil (50 m <sup>2</sup> or larger) in a clay or rocky area on property                                                                                 | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 5. Distinctive land formations on property<br>(mounds, caverns, waterfalls, peninsulas, etc.)                                                                              | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Cultural Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 6. Known burial site or cemetery on or adjacent to the property<br>(cemetery is registered with the Cemeteries Regulation Unit)                                            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 7. Food or scarce resource harvest areas on property<br>(traditional fishing locations, agricultural/berry extraction areas, etc.)                                         | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 8. Indications of early Euro-Canadian settlement within 300 m of property<br>(monuments, cemeteries, structures, etc.)                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 9. Early historic transportation routes within 100 m of property<br>(historic road, trail, portage, rail corridor, etc.)                                                   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Property-specific Information                                                                                                                                              | Yes                                 | Unknown                             | No                                  |
| 10. Property is designated and/or listed under the <i>Ontario Heritage Act</i><br>(municipal register and lands described in Reg. 875 of the <i>Ontario Heritage Act</i> ) | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 11. Local knowledge of archaeological potential of property<br>(from aboriginal communities, heritage organisations, municipal heritage committees, etc.)                  | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 12. Recent deep ground disturbance <sup>†</sup><br>(post-1960, widespread and deep land alterations)                                                                       | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |

<sup>†</sup> Archaeological potential can be determined not to be present for either the entire property or a part(s) of it when the area under consideration has been subject to widespread and deep land alterations that have severely damaged the integrity of any archaeological resources. Deep disturbance may include quarrying or major underground infrastructure development. Activities such as agricultural cultivation, gardening, minor grading and landscaping are not necessarily considered deep disturbance. Alterations can be considered to be extensive or widespread when they have affected a large area, usually defined as the majority of a property.

“Archaeological potential” is a term used to describe the likelihood that a property contains archaeological resources. This checklist is intended to assist non-specialists screening for the archaeological potential of a property where site alteration is proposed.

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|                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------|
| Project Name<br><b>Markham Stormwater Management Facilities Retrofit Study Municipal Class Environmental Assessment</b> |
| Project Location<br><b>Pond 12</b>                                                                                      |
| Proponent Name<br><b>The City of Markham</b>                                                                            |
| Proponent Contact Information                                                                                           |

| Known Archaeological Sites                                                                                                                                                 | Yes                                 | Unknown                             | No                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 1. Known archaeological sites within 300 m of property                                                                                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Physical Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 2. Body of water within 300 m of property<br>If yes, what kind of water?                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| a) Primary water source (lake, river, large creek, etc.)                                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| b) Secondary water source (stream, spring, marsh, swamp, etc.)                                                                                                             | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| c) Past water source (beach ridge, river bed, relic creek, ancient shoreline, etc.)                                                                                        | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 3. Topographical features on property<br>(knolls, drumlins, eskers, or plateaus)                                                                                           | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 4. Pockets of sandy soil (50 m <sup>2</sup> or larger) in a clay or rocky area on property                                                                                 | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 5. Distinctive land formations on property<br>(mounds, caverns, waterfalls, peninsulas, etc.)                                                                              | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Cultural Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 6. Known burial site or cemetery on or adjacent to the property<br>(cemetery is registered with the Cemeteries Regulation Unit)                                            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 7. Food or scarce resource harvest areas on property<br>(traditional fishing locations, agricultural/berry extraction areas, etc.)                                         | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 8. Indications of early Euro-Canadian settlement within 300 m of property<br>(monuments, cemeteries, structures, etc.)                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 9. Early historic transportation routes within 100 m of property<br>(historic road, trail, portage, rail corridor, etc.)                                                   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Property-specific Information                                                                                                                                              | Yes                                 | Unknown                             | No                                  |
| 10. Property is designated and/or listed under the <i>Ontario Heritage Act</i><br>(municipal register and lands described in Reg. 875 of the <i>Ontario Heritage Act</i> ) | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 11. Local knowledge of archaeological potential of property<br>(from aboriginal communities, heritage organisations, municipal heritage committees, etc.)                  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 12. Recent deep ground disturbance <sup>†</sup><br>(post-1960, widespread and deep land alterations)                                                                       | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |

<sup>†</sup> Archaeological potential can be determined not to be present for either the entire property or a part(s) of it when the area under consideration has been subject to widespread and deep land alterations that have severely damaged the integrity of any archaeological resources. Deep disturbance may include quarrying or major underground infrastructure development. Activities such as agricultural cultivation, gardening, minor grading and landscaping are not necessarily considered deep disturbance. Alterations can be considered to be extensive or widespread when they have affected a large area, usually defined as the majority of a property.

“Archaeological potential” is a term used to describe the likelihood that a property contains archaeological resources. This checklist is intended to assist non-specialists screening for the archaeological potential of a property where site alteration is proposed.

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|                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------|
| Project Name<br><b>Markham Stormwater Management Facilities Retrofit Study Municipal Class Environmental Assessment</b> |
| Project Location<br><b>Pond 23</b>                                                                                      |
| Proponent Name<br><b>The City of Markham</b>                                                                            |
| Proponent Contact Information                                                                                           |

| Known Archaeological Sites                                                                                                                                                 | Yes                                 | Unknown                             | No                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 1. Known archaeological sites within 300 m of property                                                                                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Physical Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 2. Body of water within 300 m of property<br>If yes, what kind of water?                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| a) Primary water source (lake, river, large creek, etc.)                                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| b) Secondary water source (stream, spring, marsh, swamp, etc.)                                                                                                             | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| c) Past water source (beach ridge, river bed, relic creek, ancient shoreline, etc.)                                                                                        | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 3. Topographical features on property<br>(knolls, drumlins, eskers, or plateaus)                                                                                           | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 4. Pockets of sandy soil (50 m <sup>2</sup> or larger) in a clay or rocky area on property                                                                                 | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 5. Distinctive land formations on property<br>(mounds, caverns, waterfalls, peninsulas, etc.)                                                                              | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Cultural Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 6. Known burial site or cemetery on or adjacent to the property<br>(cemetery is registered with the Cemeteries Regulation Unit)                                            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 7. Food or scarce resource harvest areas on property<br>(traditional fishing locations, agricultural/berry extraction areas, etc.)                                         | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 8. Indications of early Euro-Canadian settlement within 300 m of property<br>(monuments, cemeteries, structures, etc.)                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 9. Early historic transportation routes within 100 m of property<br>(historic road, trail, portage, rail corridor, etc.)                                                   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Property-specific Information                                                                                                                                              | Yes                                 | Unknown                             | No                                  |
| 10. Property is designated and/or listed under the <i>Ontario Heritage Act</i><br>(municipal register and lands described in Reg. 875 of the <i>Ontario Heritage Act</i> ) | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 11. Local knowledge of archaeological potential of property<br>(from aboriginal communities, heritage organisations, municipal heritage committees, etc.)                  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 12. Recent deep ground disturbance <sup>†</sup><br>(post-1960, widespread and deep land alterations)                                                                       | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |

<sup>†</sup> Archaeological potential can be determined not to be present for either the entire property or a part(s) of it when the area under consideration has been subject to widespread and deep land alterations that have severely damaged the integrity of any archaeological resources. Deep disturbance may include quarrying or major underground infrastructure development. Activities such as agricultural cultivation, gardening, minor grading and landscaping are not necessarily considered deep disturbance. Alterations can be considered to be extensive or widespread when they have affected a large area, usually defined as the majority of a property.



“Archaeological potential” is a term used to describe the likelihood that a property contains archaeological resources. This checklist is intended to assist non-specialists screening for the archaeological potential of a property where site alteration is proposed.

Note: for projects seeking a Renewable Energy Approval under Ontario Regulation 359/09, the Ministry of Tourism and Culture has developed a separate checklist to address the requirements of that regulation.

|                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------|
| Project Name<br><b>Markham Stormwater Management Facilities Retrofit Study Municipal Class Environmental Assessment</b> |
| Project Location<br><b>Pond 24</b>                                                                                      |
| Proponent Name<br><b>The City of Markham</b>                                                                            |
| Proponent Contact Information                                                                                           |

| Known Archaeological Sites                                                                                                                                                 | Yes                                 | Unknown                             | No                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 1. Known archaeological sites within 300 m of property                                                                                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Physical Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 2. Body of water within 300 m of property<br>If yes, what kind of water?                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| a) Primary water source (lake, river, large creek, etc.)                                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| b) Secondary water source (stream, spring, marsh, swamp, etc.)                                                                                                             | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| c) Past water source (beach ridge, river bed, relic creek, ancient shoreline, etc.)                                                                                        | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 3. Topographical features on property<br>(knolls, drumlins, eskers, or plateaus)                                                                                           | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 4. Pockets of sandy soil (50 m <sup>2</sup> or larger) in a clay or rocky area on property                                                                                 | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 5. Distinctive land formations on property<br>(mounds, caverns, waterfalls, peninsulas, etc.)                                                                              | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Cultural Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 6. Known burial site or cemetery on or adjacent to the property<br>(cemetery is registered with the Cemeteries Regulation Unit)                                            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 7. Food or scarce resource harvest areas on property<br>(traditional fishing locations, agricultural/berry extraction areas, etc.)                                         | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 8. Indications of early Euro-Canadian settlement within 300 m of property<br>(monuments, cemeteries, structures, etc.)                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 9. Early historic transportation routes within 100 m of property<br>(historic road, trail, portage, rail corridor, etc.)                                                   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Property-specific Information                                                                                                                                              | Yes                                 | Unknown                             | No                                  |
| 10. Property is designated and/or listed under the <i>Ontario Heritage Act</i><br>(municipal register and lands described in Reg. 875 of the <i>Ontario Heritage Act</i> ) | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 11. Local knowledge of archaeological potential of property<br>(from aboriginal communities, heritage organisations, municipal heritage committees, etc.)                  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 12. Recent deep ground disturbance <sup>†</sup><br>(post-1960, widespread and deep land alterations)                                                                       | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |

<sup>†</sup> Archaeological potential can be determined not to be present for either the entire property or a part(s) of it when the area under consideration has been subject to widespread and deep land alterations that have severely damaged the integrity of any archaeological resources. Deep disturbance may include quarrying or major underground infrastructure development. Activities such as agricultural cultivation, gardening, minor grading and landscaping are not necessarily considered deep disturbance. Alterations can be considered to be extensive or widespread when they have affected a large area, usually defined as the majority of a property.

“Archaeological potential” is a term used to describe the likelihood that a property contains archaeological resources. This checklist is intended to assist non-specialists screening for the archaeological potential of a property where site alteration is proposed.

Note: for projects seeking a Renewable Energy Approval under Ontario Regulation 359/09, the Ministry of Tourism and Culture has developed a separate checklist to address the requirements of that regulation.

|                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------|
| Project Name<br><b>Markham Stormwater Management Facilities Retrofit Study Municipal Class Environmental Assessment</b> |
| Project Location<br><b>Pond 37</b>                                                                                      |
| Proponent Name<br><b>The City of Markham</b>                                                                            |
| Proponent Contact Information                                                                                           |

| Known Archaeological Sites                                                                                                                                                 | Yes                                 | Unknown                             | No                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 1. Known archaeological sites within 300 m of property                                                                                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Physical Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 2. Body of water within 300 m of property<br>If yes, what kind of water?                                                                                                   | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| a) Primary water source (lake, river, large creek, etc.)                                                                                                                   | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| b) Secondary water source (stream, spring, marsh, swamp, etc.)                                                                                                             | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| c) Past water source (beach ridge, river bed, relic creek, ancient shoreline, etc.)                                                                                        | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 3. Topographical features on property<br>(knolls, drumlins, eskers, or plateaus)                                                                                           | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 4. Pockets of sandy soil (50 m <sup>2</sup> or larger) in a clay or rocky area on property                                                                                 | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 5. Distinctive land formations on property<br>(mounds, caverns, waterfalls, peninsulas, etc.)                                                                              | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Cultural Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 6. Known burial site or cemetery on or adjacent to the property<br>(cemetery is registered with the Cemeteries Regulation Unit)                                            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 7. Food or scarce resource harvest areas on property<br>(traditional fishing locations, agricultural/berry extraction areas, etc.)                                         | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 8. Indications of early Euro-Canadian settlement within 300 m of property<br>(monuments, cemeteries, structures, etc.)                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 9. Early historic transportation routes within 100 m of property<br>(historic road, trail, portage, rail corridor, etc.)                                                   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Property-specific Information                                                                                                                                              | Yes                                 | Unknown                             | No                                  |
| 10. Property is designated and/or listed under the <i>Ontario Heritage Act</i><br>(municipal register and lands described in Reg. 875 of the <i>Ontario Heritage Act</i> ) | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 11. Local knowledge of archaeological potential of property<br>(from aboriginal communities, heritage organisations, municipal heritage committees, etc.)                  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 12. Recent deep ground disturbance <sup>†</sup><br>(post-1960, widespread and deep land alterations)                                                                       | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |

<sup>†</sup> Archaeological potential can be determined not to be present for either the entire property or a part(s) of it when the area under consideration has been subject to widespread and deep land alterations that have severely damaged the integrity of any archaeological resources. Deep disturbance may include quarrying or major underground infrastructure development. Activities such as agricultural cultivation, gardening, minor grading and landscaping are not necessarily considered deep disturbance. Alterations can be considered to be extensive or widespread when they have affected a large area, usually defined as the majority of a property.

“Archaeological potential” is a term used to describe the likelihood that a property contains archaeological resources. This checklist is intended to assist non-specialists screening for the archaeological potential of a property where site alteration is proposed.

Note: for projects seeking a Renewable Energy Approval under Ontario Regulation 359/09, the Ministry of Tourism and Culture has developed a separate checklist to address the requirements of that regulation.

|                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------|
| Project Name<br><b>Markham Stormwater Management Facilities Retrofit Study Municipal Class Environmental Assessment</b> |
| Project Location<br><b>Pond 38</b>                                                                                      |
| Proponent Name<br><b>The City of Markham</b>                                                                            |
| Proponent Contact Information                                                                                           |

| Known Archaeological Sites                                                                                                                                                 | Yes                                 | Unknown                             | No                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 1. Known archaeological sites within 300 m of property                                                                                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Physical Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 2. Body of water within 300 m of property<br>If yes, what kind of water?                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| a) Primary water source (lake, river, large creek, etc.)                                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| b) Secondary water source (stream, spring, marsh, swamp, etc.)                                                                                                             | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| c) Past water source (beach ridge, river bed, relic creek, ancient shoreline, etc.)                                                                                        | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 3. Topographical features on property<br>(knolls, drumlins, eskers, or plateaus)                                                                                           | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 4. Pockets of sandy soil (50 m <sup>2</sup> or larger) in a clay or rocky area on property                                                                                 | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 5. Distinctive land formations on property<br>(mounds, caverns, waterfalls, peninsulas, etc.)                                                                              | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Cultural Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 6. Known burial site or cemetery on or adjacent to the property<br>(cemetery is registered with the Cemeteries Regulation Unit)                                            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 7. Food or scarce resource harvest areas on property<br>(traditional fishing locations, agricultural/berry extraction areas, etc.)                                         | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 8. Indications of early Euro-Canadian settlement within 300 m of property<br>(monuments, cemeteries, structures, etc.)                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 9. Early historic transportation routes within 100 m of property<br>(historic road, trail, portage, rail corridor, etc.)                                                   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Property-specific Information                                                                                                                                              | Yes                                 | Unknown                             | No                                  |
| 10. Property is designated and/or listed under the <i>Ontario Heritage Act</i><br>(municipal register and lands described in Reg. 875 of the <i>Ontario Heritage Act</i> ) | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 11. Local knowledge of archaeological potential of property<br>(from aboriginal communities, heritage organisations, municipal heritage committees, etc.)                  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 12. Recent deep ground disturbance <sup>†</sup><br>(post-1960, widespread and deep land alterations)                                                                       | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |

<sup>†</sup> Archaeological potential can be determined not to be present for either the entire property or a part(s) of it when the area under consideration has been subject to widespread and deep land alterations that have severely damaged the integrity of any archaeological resources. Deep disturbance may include quarrying or major underground infrastructure development. Activities such as agricultural cultivation, gardening, minor grading and landscaping are not necessarily considered deep disturbance. Alterations can be considered to be extensive or widespread when they have affected a large area, usually defined as the majority of a property.



“Archaeological potential” is a term used to describe the likelihood that a property contains archaeological resources. This checklist is intended to assist non-specialists screening for the archaeological potential of a property where site alteration is proposed.

Note: for projects seeking a Renewable Energy Approval under Ontario Regulation 359/09, the Ministry of Tourism and Culture has developed a separate checklist to address the requirements of that regulation.

|                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------|
| Project Name<br><b>Markham Stormwater Management Facilities Retrofit Study Municipal Class Environmental Assessment</b> |
| Project Location<br><b>Pond 39</b>                                                                                      |
| Proponent Name<br><b>The City of Markham</b>                                                                            |
| Proponent Contact Information                                                                                           |

| Known Archaeological Sites                                                                                                                                                 | Yes                                 | Unknown                             | No                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 1. Known archaeological sites within 300 m of property                                                                                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Physical Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 2. Body of water within 300 m of property<br>If yes, what kind of water?                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| a) Primary water source (lake, river, large creek, etc.)                                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| b) Secondary water source (stream, spring, marsh, swamp, etc.)                                                                                                             | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| c) Past water source (beach ridge, river bed, relic creek, ancient shoreline, etc.)                                                                                        | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 3. Topographical features on property<br>(knolls, drumlins, eskers, or plateaus)                                                                                           | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 4. Pockets of sandy soil (50 m <sup>2</sup> or larger) in a clay or rocky area on property                                                                                 | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 5. Distinctive land formations on property<br>(mounds, caverns, waterfalls, peninsulas, etc.)                                                                              | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Cultural Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 6. Known burial site or cemetery on or adjacent to the property<br>(cemetery is registered with the Cemeteries Regulation Unit)                                            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 7. Food or scarce resource harvest areas on property<br>(traditional fishing locations, agricultural/berry extraction areas, etc.)                                         | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 8. Indications of early Euro-Canadian settlement within 300 m of property<br>(monuments, cemeteries, structures, etc.)                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 9. Early historic transportation routes within 100 m of property<br>(historic road, trail, portage, rail corridor, etc.)                                                   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Property-specific Information                                                                                                                                              | Yes                                 | Unknown                             | No                                  |
| 10. Property is designated and/or listed under the <i>Ontario Heritage Act</i><br>(municipal register and lands described in Reg. 875 of the <i>Ontario Heritage Act</i> ) | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 11. Local knowledge of archaeological potential of property<br>(from aboriginal communities, heritage organisations, municipal heritage committees, etc.)                  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 12. Recent deep ground disturbance <sup>†</sup><br>(post-1960, widespread and deep land alterations)                                                                       | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |

<sup>†</sup> Archaeological potential can be determined not to be present for either the entire property or a part(s) of it when the area under consideration has been subject to widespread and deep land alterations that have severely damaged the integrity of any archaeological resources. Deep disturbance may include quarrying or major underground infrastructure development. Activities such as agricultural cultivation, gardening, minor grading and landscaping are not necessarily considered deep disturbance. Alterations can be considered to be extensive or widespread when they have affected a large area, usually defined as the majority of a property.

“Archaeological potential” is a term used to describe the likelihood that a property contains archaeological resources. This checklist is intended to assist non-specialists screening for the archaeological potential of a property where site alteration is proposed.

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|                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------|
| Project Name<br><b>Markham Stormwater Management Facilities Retrofit Study Municipal Class Environmental Assessment</b> |
| Project Location<br><b>Pond 42</b>                                                                                      |
| Proponent Name<br><b>The City of Markham</b>                                                                            |
| Proponent Contact Information                                                                                           |

| Known Archaeological Sites                                                                                                                                                 | Yes                                 | Unknown                             | No                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 1. Known archaeological sites within 300 m of property                                                                                                                     | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| Physical Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 2. Body of water within 300 m of property<br>If yes, what kind of water?                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| a) Primary water source (lake, river, large creek, etc.)                                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| b) Secondary water source (stream, spring, marsh, swamp, etc.)                                                                                                             | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| c) Past water source (beach ridge, river bed, relic creek, ancient shoreline, etc.)                                                                                        | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 3. Topographical features on property<br>(knolls, drumlins, eskers, or plateaus)                                                                                           | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 4. Pockets of sandy soil (50 m <sup>2</sup> or larger) in a clay or rocky area on property                                                                                 | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 5. Distinctive land formations on property<br>(mounds, caverns, waterfalls, peninsulas, etc.)                                                                              | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Cultural Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 6. Known burial site or cemetery on or adjacent to the property<br>(cemetery is registered with the Cemeteries Regulation Unit)                                            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 7. Food or scarce resource harvest areas on property<br>(traditional fishing locations, agricultural/berry extraction areas, etc.)                                         | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 8. Indications of early Euro-Canadian settlement within 300 m of property<br>(monuments, cemeteries, structures, etc.)                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 9. Early historic transportation routes within 100 m of property<br>(historic road, trail, portage, rail corridor, etc.)                                                   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Property-specific Information                                                                                                                                              | Yes                                 | Unknown                             | No                                  |
| 10. Property is designated and/or listed under the <i>Ontario Heritage Act</i><br>(municipal register and lands described in Reg. 875 of the <i>Ontario Heritage Act</i> ) | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 11. Local knowledge of archaeological potential of property<br>(from aboriginal communities, heritage organisations, municipal heritage committees, etc.)                  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 12. Recent deep ground disturbance <sup>†</sup><br>(post-1960, widespread and deep land alterations)                                                                       | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |

<sup>†</sup> Archaeological potential can be determined not to be present for either the entire property or a part(s) of it when the area under consideration has been subject to widespread and deep land alterations that have severely damaged the integrity of any archaeological resources. Deep disturbance may include quarrying or major underground infrastructure development. Activities such as agricultural cultivation, gardening, minor grading and landscaping are not necessarily considered deep disturbance. Alterations can be considered to be extensive or widespread when they have affected a large area, usually defined as the majority of a property.

“Archaeological potential” is a term used to describe the likelihood that a property contains archaeological resources. This checklist is intended to assist non-specialists screening for the archaeological potential of a property where site alteration is proposed.

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|                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------|
| Project Name<br><b>Markham Stormwater Management Facilities Retrofit Study Municipal Class Environmental Assessment</b> |
| Project Location<br><b>Pond 45</b>                                                                                      |
| Proponent Name<br><b>The City of Markham</b>                                                                            |
| Proponent Contact Information                                                                                           |

| Known Archaeological Sites                                                                                                                                                 | Yes                                 | Unknown                             | No                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 1. Known archaeological sites within 300 m of property                                                                                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Physical Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 2. Body of water within 300 m of property<br>If yes, what kind of water?                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| a) Primary water source (lake, river, large creek, etc.)                                                                                                                   | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| b) Secondary water source (stream, spring, marsh, swamp, etc.)                                                                                                             | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| c) Past water source (beach ridge, river bed, relic creek, ancient shoreline, etc.)                                                                                        | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 3. Topographical features on property<br>(knolls, drumlins, eskers, or plateaus)                                                                                           | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 4. Pockets of sandy soil (50 m <sup>2</sup> or larger) in a clay or rocky area on property                                                                                 | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 5. Distinctive land formations on property<br>(mounds, caverns, waterfalls, peninsulas, etc.)                                                                              | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Cultural Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 6. Known burial site or cemetery on or adjacent to the property<br>(cemetery is registered with the Cemeteries Regulation Unit)                                            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 7. Food or scarce resource harvest areas on property<br>(traditional fishing locations, agricultural/berry extraction areas, etc.)                                         | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 8. Indications of early Euro-Canadian settlement within 300 m of property<br>(monuments, cemeteries, structures, etc.)                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 9. Early historic transportation routes within 100 m of property<br>(historic road, trail, portage, rail corridor, etc.)                                                   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Property-specific Information                                                                                                                                              | Yes                                 | Unknown                             | No                                  |
| 10. Property is designated and/or listed under the <i>Ontario Heritage Act</i><br>(municipal register and lands described in Reg. 875 of the <i>Ontario Heritage Act</i> ) | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 11. Local knowledge of archaeological potential of property<br>(from aboriginal communities, heritage organisations, municipal heritage committees, etc.)                  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 12. Recent deep ground disturbance <sup>†</sup><br>(post-1960, widespread and deep land alterations)                                                                       | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |

<sup>†</sup> Archaeological potential can be determined not to be present for either the entire property or a part(s) of it when the area under consideration has been subject to widespread and deep land alterations that have severely damaged the integrity of any archaeological resources. Deep disturbance may include quarrying or major underground infrastructure development. Activities such as agricultural cultivation, gardening, minor grading and landscaping are not necessarily considered deep disturbance. Alterations can be considered to be extensive or widespread when they have affected a large area, usually defined as the majority of a property.



“Archaeological potential” is a term used to describe the likelihood that a property contains archaeological resources. This checklist is intended to assist non-specialists screening for the archaeological potential of a property where site alteration is proposed.

Note: for projects seeking a Renewable Energy Approval under Ontario Regulation 359/09, the Ministry of Tourism and Culture has developed a separate checklist to address the requirements of that regulation.

|                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------|
| Project Name<br><b>Markham Stormwater Management Facilities Retrofit Study Municipal Class Environmental Assessment</b> |
| Project Location<br><b>Pond 47</b>                                                                                      |
| Proponent Name<br><b>The City of Markham</b>                                                                            |
| Proponent Contact Information                                                                                           |

| Known Archaeological Sites                                                                                                                                                 | Yes                                 | Unknown                             | No                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 1. Known archaeological sites within 300 m of property                                                                                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Physical Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 2. Body of water within 300 m of property<br>If yes, what kind of water?                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| a) Primary water source (lake, river, large creek, etc.)                                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| b) Secondary water source (stream, spring, marsh, swamp, etc.)                                                                                                             | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| c) Past water source (beach ridge, river bed, relic creek, ancient shoreline, etc.)                                                                                        | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 3. Topographical features on property<br>(knolls, drumlins, eskers, or plateaus)                                                                                           | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 4. Pockets of sandy soil (50 m <sup>2</sup> or larger) in a clay or rocky area on property                                                                                 | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 5. Distinctive land formations on property<br>(mounds, caverns, waterfalls, peninsulas, etc.)                                                                              | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Cultural Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 6. Known burial site or cemetery on or adjacent to the property<br>(cemetery is registered with the Cemeteries Regulation Unit)                                            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 7. Food or scarce resource harvest areas on property<br>(traditional fishing locations, agricultural/berry extraction areas, etc.)                                         | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 8. Indications of early Euro-Canadian settlement within 300 m of property<br>(monuments, cemeteries, structures, etc.)                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 9. Early historic transportation routes within 100 m of property<br>(historic road, trail, portage, rail corridor, etc.)                                                   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Property-specific Information                                                                                                                                              | Yes                                 | Unknown                             | No                                  |
| 10. Property is designated and/or listed under the <i>Ontario Heritage Act</i><br>(municipal register and lands described in Reg. 875 of the <i>Ontario Heritage Act</i> ) | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 11. Local knowledge of archaeological potential of property<br>(from aboriginal communities, heritage organisations, municipal heritage committees, etc.)                  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 12. Recent deep ground disturbance <sup>†</sup><br>(post-1960, widespread and deep land alterations)                                                                       | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |

<sup>†</sup> Archaeological potential can be determined not to be present for either the entire property or a part(s) of it when the area under consideration has been subject to widespread and deep land alterations that have severely damaged the integrity of any archaeological resources. Deep disturbance may include quarrying or major underground infrastructure development. Activities such as agricultural cultivation, gardening, minor grading and landscaping are not necessarily considered deep disturbance. Alterations can be considered to be extensive or widespread when they have affected a large area, usually defined as the majority of a property.

“Archaeological potential” is a term used to describe the likelihood that a property contains archaeological resources. This checklist is intended to assist non-specialists screening for the archaeological potential of a property where site alteration is proposed.

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|                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------|
| Project Name<br><b>Markham Stormwater Management Facilities Retrofit Study Municipal Class Environmental Assessment</b> |
| Project Location<br><b>Pond 48</b>                                                                                      |
| Proponent Name<br><b>The City of Markham</b>                                                                            |
| Proponent Contact Information                                                                                           |

| Known Archaeological Sites                                                                                                                                                 | Yes                                 | Unknown                             | No                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 1. Known archaeological sites within 300 m of property                                                                                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Physical Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 2. Body of water within 300 m of property<br>If yes, what kind of water?                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| a) Primary water source (lake, river, large creek, etc.)                                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| b) Secondary water source (stream, spring, marsh, swamp, etc.)                                                                                                             | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| c) Past water source (beach ridge, river bed, relic creek, ancient shoreline, etc.)                                                                                        | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 3. Topographical features on property<br>(knolls, drumlins, eskers, or plateaus)                                                                                           | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 4. Pockets of sandy soil (50 m <sup>2</sup> or larger) in a clay or rocky area on property                                                                                 | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 5. Distinctive land formations on property<br>(mounds, caverns, waterfalls, peninsulas, etc.)                                                                              | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Cultural Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 6. Known burial site or cemetery on or adjacent to the property<br>(cemetery is registered with the Cemeteries Regulation Unit)                                            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 7. Food or scarce resource harvest areas on property<br>(traditional fishing locations, agricultural/berry extraction areas, etc.)                                         | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 8. Indications of early Euro-Canadian settlement within 300 m of property<br>(monuments, cemeteries, structures, etc.)                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 9. Early historic transportation routes within 100 m of property<br>(historic road, trail, portage, rail corridor, etc.)                                                   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Property-specific Information                                                                                                                                              | Yes                                 | Unknown                             | No                                  |
| 10. Property is designated and/or listed under the <i>Ontario Heritage Act</i><br>(municipal register and lands described in Reg. 875 of the <i>Ontario Heritage Act</i> ) | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 11. Local knowledge of archaeological potential of property<br>(from aboriginal communities, heritage organisations, municipal heritage committees, etc.)                  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 12. Recent deep ground disturbance <sup>†</sup><br>(post-1960, widespread and deep land alterations)                                                                       | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |

<sup>†</sup> Archaeological potential can be determined not to be present for either the entire property or a part(s) of it when the area under consideration has been subject to widespread and deep land alterations that have severely damaged the integrity of any archaeological resources. Deep disturbance may include quarrying or major underground infrastructure development. Activities such as agricultural cultivation, gardening, minor grading and landscaping are not necessarily considered deep disturbance. Alterations can be considered to be extensive or widespread when they have affected a large area, usually defined as the majority of a property.

“Archaeological potential” is a term used to describe the likelihood that a property contains archaeological resources. This checklist is intended to assist non-specialists screening for the archaeological potential of a property where site alteration is proposed.

Note: for projects seeking a Renewable Energy Approval under Ontario Regulation 359/09, the Ministry of Tourism and Culture has developed a separate checklist to address the requirements of that regulation.

|                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------|
| Project Name<br><b>Markham Stormwater Management Facilities Retrofit Study Municipal Class Environmental Assessment</b> |
| Project Location<br><b>Pond 51</b>                                                                                      |
| Proponent Name<br><b>The City of Markham</b>                                                                            |
| Proponent Contact Information                                                                                           |

| Known Archaeological Sites                                                                                                                                                 | Yes                                 | Unknown                             | No                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 1. Known archaeological sites within 300 m of property                                                                                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Physical Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 2. Body of water within 300 m of property<br>If yes, what kind of water?                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| a) Primary water source (lake, river, large creek, etc.)                                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| b) Secondary water source (stream, spring, marsh, swamp, etc.)                                                                                                             | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| c) Past water source (beach ridge, river bed, relic creek, ancient shoreline, etc.)                                                                                        | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 3. Topographical features on property<br>(knolls, drumlins, eskers, or plateaus)                                                                                           | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 4. Pockets of sandy soil (50 m <sup>2</sup> or larger) in a clay or rocky area on property                                                                                 | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 5. Distinctive land formations on property<br>(mounds, caverns, waterfalls, peninsulas, etc.)                                                                              | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Cultural Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 6. Known burial site or cemetery on or adjacent to the property<br>(cemetery is registered with the Cemeteries Regulation Unit)                                            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 7. Food or scarce resource harvest areas on property<br>(traditional fishing locations, agricultural/berry extraction areas, etc.)                                         | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 8. Indications of early Euro-Canadian settlement within 300 m of property<br>(monuments, cemeteries, structures, etc.)                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 9. Early historic transportation routes within 100 m of property<br>(historic road, trail, portage, rail corridor, etc.)                                                   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Property-specific Information                                                                                                                                              | Yes                                 | Unknown                             | No                                  |
| 10. Property is designated and/or listed under the <i>Ontario Heritage Act</i><br>(municipal register and lands described in Reg. 875 of the <i>Ontario Heritage Act</i> ) | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 11. Local knowledge of archaeological potential of property<br>(from aboriginal communities, heritage organisations, municipal heritage committees, etc.)                  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 12. Recent deep ground disturbance <sup>†</sup><br>(post-1960, widespread and deep land alterations)                                                                       | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |

<sup>†</sup> Archaeological potential can be determined not to be present for either the entire property or a part(s) of it when the area under consideration has been subject to widespread and deep land alterations that have severely damaged the integrity of any archaeological resources. Deep disturbance may include quarrying or major underground infrastructure development. Activities such as agricultural cultivation, gardening, minor grading and landscaping are not necessarily considered deep disturbance. Alterations can be considered to be extensive or widespread when they have affected a large area, usually defined as the majority of a property.



“Archaeological potential” is a term used to describe the likelihood that a property contains archaeological resources. This checklist is intended to assist non-specialists screening for the archaeological potential of a property where site alteration is proposed.

Note: for projects seeking a Renewable Energy Approval under Ontario Regulation 359/09, the Ministry of Tourism and Culture has developed a separate checklist to address the requirements of that regulation.

|                               |                                                                                                         |
|-------------------------------|---------------------------------------------------------------------------------------------------------|
| Project Name                  | <b>Markham Stormwater Management Facilities Retrofit Study Municipal Class Environmental Assessment</b> |
| Project Location              | <b>Pond 52</b>                                                                                          |
| Proponent Name                | <b>The City of Markham</b>                                                                              |
| Proponent Contact Information |                                                                                                         |

| Known Archaeological Sites                                                                                                                                                 | Yes                                 | Unknown                             | No                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 1. Known archaeological sites within 300 m of property                                                                                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Physical Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 2. Body of water within 300 m of property<br>If yes, what kind of water?                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| a) Primary water source (lake, river, large creek, etc.)                                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| b) Secondary water source (stream, spring, marsh, swamp, etc.)                                                                                                             | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| c) Past water source (beach ridge, river bed, relic creek, ancient shoreline, etc.)                                                                                        | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 3. Topographical features on property<br>(knolls, drumlins, eskers, or plateaus)                                                                                           | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 4. Pockets of sandy soil (50 m <sup>2</sup> or larger) in a clay or rocky area on property                                                                                 | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 5. Distinctive land formations on property<br>(mounds, caverns, waterfalls, peninsulas, etc.)                                                                              | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Cultural Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 6. Known burial site or cemetery on or adjacent to the property<br>(cemetery is registered with the Cemeteries Regulation Unit)                                            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 7. Food or scarce resource harvest areas on property<br>(traditional fishing locations, agricultural/berry extraction areas, etc.)                                         | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 8. Indications of early Euro-Canadian settlement within 300 m of property<br>(monuments, cemeteries, structures, etc.)                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 9. Early historic transportation routes within 100 m of property<br>(historic road, trail, portage, rail corridor, etc.)                                                   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Property-specific Information                                                                                                                                              | Yes                                 | Unknown                             | No                                  |
| 10. Property is designated and/or listed under the <i>Ontario Heritage Act</i><br>(municipal register and lands described in Reg. 875 of the <i>Ontario Heritage Act</i> ) | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 11. Local knowledge of archaeological potential of property<br>(from aboriginal communities, heritage organisations, municipal heritage committees, etc.)                  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 12. Recent deep ground disturbance <sup>†</sup><br>(post-1960, widespread and deep land alterations)                                                                       | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |

<sup>†</sup> Archaeological potential can be determined not to be present for either the entire property or a part(s) of it when the area under consideration has been subject to widespread and deep land alterations that have severely damaged the integrity of any archaeological resources. Deep disturbance may include quarrying or major underground infrastructure development. Activities such as agricultural cultivation, gardening, minor grading and landscaping are not necessarily considered deep disturbance. Alterations can be considered to be extensive or widespread when they have affected a large area, usually defined as the majority of a property.

“Archaeological potential” is a term used to describe the likelihood that a property contains archaeological resources. This checklist is intended to assist non-specialists screening for the archaeological potential of a property where site alteration is proposed.

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|                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------|
| Project Name<br><b>Markham Stormwater Management Facilities Retrofit Study Municipal Class Environmental Assessment</b> |
| Project Location<br><b>Pond 53</b>                                                                                      |
| Proponent Name<br><b>The City of Markham</b>                                                                            |
| Proponent Contact Information                                                                                           |

| Known Archaeological Sites                                                                                                                                                 | Yes                                 | Unknown                             | No                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 1. Known archaeological sites within 300 m of property                                                                                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Physical Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 2. Body of water within 300 m of property<br>If yes, what kind of water?                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| a) Primary water source (lake, river, large creek, etc.)                                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| b) Secondary water source (stream, spring, marsh, swamp, etc.)                                                                                                             | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| c) Past water source (beach ridge, river bed, relic creek, ancient shoreline, etc.)                                                                                        | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 3. Topographical features on property<br>(knolls, drumlins, eskers, or plateaus)                                                                                           | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 4. Pockets of sandy soil (50 m <sup>2</sup> or larger) in a clay or rocky area on property                                                                                 | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 5. Distinctive land formations on property<br>(mounds, caverns, waterfalls, peninsulas, etc.)                                                                              | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Cultural Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 6. Known burial site or cemetery on or adjacent to the property<br>(cemetery is registered with the Cemeteries Regulation Unit)                                            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 7. Food or scarce resource harvest areas on property<br>(traditional fishing locations, agricultural/berry extraction areas, etc.)                                         | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 8. Indications of early Euro-Canadian settlement within 300 m of property<br>(monuments, cemeteries, structures, etc.)                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 9. Early historic transportation routes within 100 m of property<br>(historic road, trail, portage, rail corridor, etc.)                                                   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Property-specific Information                                                                                                                                              | Yes                                 | Unknown                             | No                                  |
| 10. Property is designated and/or listed under the <i>Ontario Heritage Act</i><br>(municipal register and lands described in Reg. 875 of the <i>Ontario Heritage Act</i> ) | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 11. Local knowledge of archaeological potential of property<br>(from aboriginal communities, heritage organisations, municipal heritage committees, etc.)                  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 12. Recent deep ground disturbance <sup>†</sup><br>(post-1960, widespread and deep land alterations)                                                                       | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |

<sup>†</sup> Archaeological potential can be determined not to be present for either the entire property or a part(s) of it when the area under consideration has been subject to widespread and deep land alterations that have severely damaged the integrity of any archaeological resources. Deep disturbance may include quarrying or major underground infrastructure development. Activities such as agricultural cultivation, gardening, minor grading and landscaping are not necessarily considered deep disturbance. Alterations can be considered to be extensive or widespread when they have affected a large area, usually defined as the majority of a property.

“Archaeological potential” is a term used to describe the likelihood that a property contains archaeological resources. This checklist is intended to assist non-specialists screening for the archaeological potential of a property where site alteration is proposed.

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|                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------|
| Project Name<br><b>Markham Stormwater Management Facilities Retrofit Study Municipal Class Environmental Assessment</b> |
| Project Location<br><b>Pond 55</b>                                                                                      |
| Proponent Name<br><b>The City of Markham</b>                                                                            |
| Proponent Contact Information                                                                                           |

| Known Archaeological Sites                                                                                                                                                 | Yes                                 | Unknown                             | No                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 1. Known archaeological sites within 300 m of property                                                                                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Physical Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 2. Body of water within 300 m of property<br>If yes, what kind of water?                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| a) Primary water source (lake, river, large creek, etc.)                                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| b) Secondary water source (stream, spring, marsh, swamp, etc.)                                                                                                             | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| c) Past water source (beach ridge, river bed, relic creek, ancient shoreline, etc.)                                                                                        | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 3. Topographical features on property<br>(knolls, drumlins, eskers, or plateaus)                                                                                           | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 4. Pockets of sandy soil (50 m <sup>2</sup> or larger) in a clay or rocky area on property                                                                                 | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 5. Distinctive land formations on property<br>(mounds, caverns, waterfalls, peninsulas, etc.)                                                                              | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Cultural Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 6. Known burial site or cemetery on or adjacent to the property<br>(cemetery is registered with the Cemeteries Regulation Unit)                                            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 7. Food or scarce resource harvest areas on property<br>(traditional fishing locations, agricultural/berry extraction areas, etc.)                                         | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 8. Indications of early Euro-Canadian settlement within 300 m of property<br>(monuments, cemeteries, structures, etc.)                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 9. Early historic transportation routes within 100 m of property<br>(historic road, trail, portage, rail corridor, etc.)                                                   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Property-specific Information                                                                                                                                              | Yes                                 | Unknown                             | No                                  |
| 10. Property is designated and/or listed under the <i>Ontario Heritage Act</i><br>(municipal register and lands described in Reg. 875 of the <i>Ontario Heritage Act</i> ) | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 11. Local knowledge of archaeological potential of property<br>(from aboriginal communities, heritage organisations, municipal heritage committees, etc.)                  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 12. Recent deep ground disturbance <sup>†</sup><br>(post-1960, widespread and deep land alterations)                                                                       | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |

<sup>†</sup> Archaeological potential can be determined not to be present for either the entire property or a part(s) of it when the area under consideration has been subject to widespread and deep land alterations that have severely damaged the integrity of any archaeological resources. Deep disturbance may include quarrying or major underground infrastructure development. Activities such as agricultural cultivation, gardening, minor grading and landscaping are not necessarily considered deep disturbance. Alterations can be considered to be extensive or widespread when they have affected a large area, usually defined as the majority of a property.



“Archaeological potential” is a term used to describe the likelihood that a property contains archaeological resources. This checklist is intended to assist non-specialists screening for the archaeological potential of a property where site alteration is proposed.

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|                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------|
| Project Name<br><b>Markham Stormwater Management Facilities Retrofit Study Municipal Class Environmental Assessment</b> |
| Project Location<br><b>Pond 60</b>                                                                                      |
| Proponent Name<br><b>The City of Markham</b>                                                                            |
| Proponent Contact Information                                                                                           |

| Known Archaeological Sites                                                                                                                                                 | Yes                                 | Unknown                             | No                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 1. Known archaeological sites within 300 m of property                                                                                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Physical Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 2. Body of water within 300 m of property<br>If yes, what kind of water?                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| a) Primary water source (lake, river, large creek, etc.)                                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| b) Secondary water source (stream, spring, marsh, swamp, etc.)                                                                                                             | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| c) Past water source (beach ridge, river bed, relic creek, ancient shoreline, etc.)                                                                                        | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 3. Topographical features on property<br>(knolls, drumlins, eskers, or plateaus)                                                                                           | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 4. Pockets of sandy soil (50 m <sup>2</sup> or larger) in a clay or rocky area on property                                                                                 | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 5. Distinctive land formations on property<br>(mounds, caverns, waterfalls, peninsulas, etc.)                                                                              | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Cultural Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 6. Known burial site or cemetery on or adjacent to the property<br>(cemetery is registered with the Cemeteries Regulation Unit)                                            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 7. Food or scarce resource harvest areas on property<br>(traditional fishing locations, agricultural/berry extraction areas, etc.)                                         | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 8. Indications of early Euro-Canadian settlement within 300 m of property<br>(monuments, cemeteries, structures, etc.)                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 9. Early historic transportation routes within 100 m of property<br>(historic road, trail, portage, rail corridor, etc.)                                                   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Property-specific Information                                                                                                                                              | Yes                                 | Unknown                             | No                                  |
| 10. Property is designated and/or listed under the <i>Ontario Heritage Act</i><br>(municipal register and lands described in Reg. 875 of the <i>Ontario Heritage Act</i> ) | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 11. Local knowledge of archaeological potential of property<br>(from aboriginal communities, heritage organisations, municipal heritage committees, etc.)                  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 12. Recent deep ground disturbance <sup>†</sup><br>(post-1960, widespread and deep land alterations)                                                                       | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |

<sup>†</sup> Archaeological potential can be determined not to be present for either the entire property or a part(s) of it when the area under consideration has been subject to widespread and deep land alterations that have severely damaged the integrity of any archaeological resources. Deep disturbance may include quarrying or major underground infrastructure development. Activities such as agricultural cultivation, gardening, minor grading and landscaping are not necessarily considered deep disturbance. Alterations can be considered to be extensive or widespread when they have affected a large area, usually defined as the majority of a property.

“Archaeological potential” is a term used to describe the likelihood that a property contains archaeological resources. This checklist is intended to assist non-specialists screening for the archaeological potential of a property where site alteration is proposed.

Note: for projects seeking a Renewable Energy Approval under Ontario Regulation 359/09, the Ministry of Tourism and Culture has developed a separate checklist to address the requirements of that regulation.

|                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------|
| Project Name<br><b>Markham Stormwater Management Facilities Retrofit Study Municipal Class Environmental Assessment</b> |
| Project Location<br><b>Pond 62</b>                                                                                      |
| Proponent Name<br><b>The City of Markham</b>                                                                            |
| Proponent Contact Information                                                                                           |

| Known Archaeological Sites                                                                                                                                                 | Yes                                 | Unknown                             | No                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 1. Known archaeological sites within 300 m of property                                                                                                                     | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| Physical Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 2. Body of water within 300 m of property<br>If yes, what kind of water?                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| a) Primary water source (lake, river, large creek, etc.)                                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| b) Secondary water source (stream, spring, marsh, swamp, etc.)                                                                                                             | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| c) Past water source (beach ridge, river bed, relic creek, ancient shoreline, etc.)                                                                                        | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 3. Topographical features on property<br>(knolls, drumlins, eskers, or plateaus)                                                                                           | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 4. Pockets of sandy soil (50 m <sup>2</sup> or larger) in a clay or rocky area on property                                                                                 | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 5. Distinctive land formations on property<br>(mounds, caverns, waterfalls, peninsulas, etc.)                                                                              | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Cultural Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 6. Known burial site or cemetery on or adjacent to the property<br>(cemetery is registered with the Cemeteries Regulation Unit)                                            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 7. Food or scarce resource harvest areas on property<br>(traditional fishing locations, agricultural/berry extraction areas, etc.)                                         | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 8. Indications of early Euro-Canadian settlement within 300 m of property<br>(monuments, cemeteries, structures, etc.)                                                     | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 9. Early historic transportation routes within 100 m of property<br>(historic road, trail, portage, rail corridor, etc.)                                                   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Property-specific Information                                                                                                                                              | Yes                                 | Unknown                             | No                                  |
| 10. Property is designated and/or listed under the <i>Ontario Heritage Act</i><br>(municipal register and lands described in Reg. 875 of the <i>Ontario Heritage Act</i> ) | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 11. Local knowledge of archaeological potential of property<br>(from aboriginal communities, heritage organisations, municipal heritage committees, etc.)                  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 12. Recent deep ground disturbance <sup>†</sup><br>(post-1960, widespread and deep land alterations)                                                                       | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |

<sup>†</sup> Archaeological potential can be determined not to be present for either the entire property or a part(s) of it when the area under consideration has been subject to widespread and deep land alterations that have severely damaged the integrity of any archaeological resources. Deep disturbance may include quarrying or major underground infrastructure development. Activities such as agricultural cultivation, gardening, minor grading and landscaping are not necessarily considered deep disturbance. Alterations can be considered to be extensive or widespread when they have affected a large area, usually defined as the majority of a property.

“Archaeological potential” is a term used to describe the likelihood that a property contains archaeological resources. This checklist is intended to assist non-specialists screening for the archaeological potential of a property where site alteration is proposed.

Note: for projects seeking a Renewable Energy Approval under Ontario Regulation 359/09, the Ministry of Tourism and Culture has developed a separate checklist to address the requirements of that regulation.

|                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------|
| Project Name<br><b>Markham Stormwater Management Facilities Retrofit Study Municipal Class Environmental Assessment</b> |
| Project Location<br><b>Pond 67</b>                                                                                      |
| Proponent Name<br><b>The City of Markham</b>                                                                            |
| Proponent Contact Information                                                                                           |

| Known Archaeological Sites                                                                                                                                                 | Yes                                 | Unknown                             | No                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 1. Known archaeological sites within 300 m of property                                                                                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Physical Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 2. Body of water within 300 m of property<br>If yes, what kind of water?                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| a) Primary water source (lake, river, large creek, etc.)                                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| b) Secondary water source (stream, spring, marsh, swamp, etc.)                                                                                                             | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| c) Past water source (beach ridge, river bed, relic creek, ancient shoreline, etc.)                                                                                        | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 3. Topographical features on property<br>(knolls, drumlins, eskers, or plateaus)                                                                                           | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 4. Pockets of sandy soil (50 m <sup>2</sup> or larger) in a clay or rocky area on property                                                                                 | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 5. Distinctive land formations on property<br>(mounds, caverns, waterfalls, peninsulas, etc.)                                                                              | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Cultural Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 6. Known burial site or cemetery on or adjacent to the property<br>(cemetery is registered with the Cemeteries Regulation Unit)                                            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 7. Food or scarce resource harvest areas on property<br>(traditional fishing locations, agricultural/berry extraction areas, etc.)                                         | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 8. Indications of early Euro-Canadian settlement within 300 m of property<br>(monuments, cemeteries, structures, etc.)                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 9. Early historic transportation routes within 100 m of property<br>(historic road, trail, portage, rail corridor, etc.)                                                   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Property-specific Information                                                                                                                                              | Yes                                 | Unknown                             | No                                  |
| 10. Property is designated and/or listed under the <i>Ontario Heritage Act</i><br>(municipal register and lands described in Reg. 875 of the <i>Ontario Heritage Act</i> ) | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 11. Local knowledge of archaeological potential of property<br>(from aboriginal communities, heritage organisations, municipal heritage committees, etc.)                  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 12. Recent deep ground disturbance <sup>†</sup><br>(post-1960, widespread and deep land alterations)                                                                       | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |

<sup>†</sup> Archaeological potential can be determined not to be present for either the entire property or a part(s) of it when the area under consideration has been subject to widespread and deep land alterations that have severely damaged the integrity of any archaeological resources. Deep disturbance may include quarrying or major underground infrastructure development. Activities such as agricultural cultivation, gardening, minor grading and landscaping are not necessarily considered deep disturbance. Alterations can be considered to be extensive or widespread when they have affected a large area, usually defined as the majority of a property.



“Archaeological potential” is a term used to describe the likelihood that a property contains archaeological resources. This checklist is intended to assist non-specialists screening for the archaeological potential of a property where site alteration is proposed.

Note: for projects seeking a Renewable Energy Approval under Ontario Regulation 359/09, the Ministry of Tourism and Culture has developed a separate checklist to address the requirements of that regulation.

|                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------|
| Project Name<br><b>Markham Stormwater Management Facilities Retrofit Study Municipal Class Environmental Assessment</b> |
| Project Location<br><b>Pond 73</b>                                                                                      |
| Proponent Name<br><b>The City of Markham</b>                                                                            |
| Proponent Contact Information                                                                                           |

| Known Archaeological Sites                                                                                                                                                 | Yes                                 | Unknown                             | No                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 1. Known archaeological sites within 300 m of property                                                                                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Physical Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 2. Body of water within 300 m of property<br>If yes, what kind of water?                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| a) Primary water source (lake, river, large creek, etc.)                                                                                                                   | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| b) Secondary water source (stream, spring, marsh, swamp, etc.)                                                                                                             | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| c) Past water source (beach ridge, river bed, relic creek, ancient shoreline, etc.)                                                                                        | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 3. Topographical features on property<br>(knolls, drumlins, eskers, or plateaus)                                                                                           | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 4. Pockets of sandy soil (50 m <sup>2</sup> or larger) in a clay or rocky area on property                                                                                 | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 5. Distinctive land formations on property<br>(mounds, caverns, waterfalls, peninsulas, etc.)                                                                              | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Cultural Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 6. Known burial site or cemetery on or adjacent to the property<br>(cemetery is registered with the Cemeteries Regulation Unit)                                            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 7. Food or scarce resource harvest areas on property<br>(traditional fishing locations, agricultural/berry extraction areas, etc.)                                         | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 8. Indications of early Euro-Canadian settlement within 300 m of property<br>(monuments, cemeteries, structures, etc.)                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 9. Early historic transportation routes within 100 m of property<br>(historic road, trail, portage, rail corridor, etc.)                                                   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Property-specific Information                                                                                                                                              | Yes                                 | Unknown                             | No                                  |
| 10. Property is designated and/or listed under the <i>Ontario Heritage Act</i><br>(municipal register and lands described in Reg. 875 of the <i>Ontario Heritage Act</i> ) | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 11. Local knowledge of archaeological potential of property<br>(from aboriginal communities, heritage organisations, municipal heritage committees, etc.)                  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 12. Recent deep ground disturbance <sup>†</sup><br>(post-1960, widespread and deep land alterations)                                                                       | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |

<sup>†</sup> Archaeological potential can be determined not to be present for either the entire property or a part(s) of it when the area under consideration has been subject to widespread and deep land alterations that have severely damaged the integrity of any archaeological resources. Deep disturbance may include quarrying or major underground infrastructure development. Activities such as agricultural cultivation, gardening, minor grading and landscaping are not necessarily considered deep disturbance. Alterations can be considered to be extensive or widespread when they have affected a large area, usually defined as the majority of a property.

“Archaeological potential” is a term used to describe the likelihood that a property contains archaeological resources. This checklist is intended to assist non-specialists screening for the archaeological potential of a property where site alteration is proposed.

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|                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------|
| Project Name<br><b>Markham Stormwater Management Facilities Retrofit Study Municipal Class Environmental Assessment</b> |
| Project Location<br><b>Pond 77</b>                                                                                      |
| Proponent Name<br><b>The City of Markham</b>                                                                            |
| Proponent Contact Information                                                                                           |

| Known Archaeological Sites                                                                                                                                                 | Yes                                 | Unknown                             | No                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 1. Known archaeological sites within 300 m of property                                                                                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Physical Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 2. Body of water within 300 m of property<br>If yes, what kind of water?                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| a) Primary water source (lake, river, large creek, etc.)                                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| b) Secondary water source (stream, spring, marsh, swamp, etc.)                                                                                                             | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| c) Past water source (beach ridge, river bed, relic creek, ancient shoreline, etc.)                                                                                        | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 3. Topographical features on property<br>(knolls, drumlins, eskers, or plateaus)                                                                                           | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 4. Pockets of sandy soil (50 m <sup>2</sup> or larger) in a clay or rocky area on property                                                                                 | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 5. Distinctive land formations on property<br>(mounds, caverns, waterfalls, peninsulas, etc.)                                                                              | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Cultural Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 6. Known burial site or cemetery on or adjacent to the property<br>(cemetery is registered with the Cemeteries Regulation Unit)                                            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 7. Food or scarce resource harvest areas on property<br>(traditional fishing locations, agricultural/berry extraction areas, etc.)                                         | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 8. Indications of early Euro-Canadian settlement within 300 m of property<br>(monuments, cemeteries, structures, etc.)                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 9. Early historic transportation routes within 100 m of property<br>(historic road, trail, portage, rail corridor, etc.)                                                   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Property-specific Information                                                                                                                                              | Yes                                 | Unknown                             | No                                  |
| 10. Property is designated and/or listed under the <i>Ontario Heritage Act</i><br>(municipal register and lands described in Reg. 875 of the <i>Ontario Heritage Act</i> ) | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 11. Local knowledge of archaeological potential of property<br>(from aboriginal communities, heritage organisations, municipal heritage committees, etc.)                  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 12. Recent deep ground disturbance <sup>†</sup><br>(post-1960, widespread and deep land alterations)                                                                       | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |

<sup>†</sup> Archaeological potential can be determined not to be present for either the entire property or a part(s) of it when the area under consideration has been subject to widespread and deep land alterations that have severely damaged the integrity of any archaeological resources. Deep disturbance may include quarrying or major underground infrastructure development. Activities such as agricultural cultivation, gardening, minor grading and landscaping are not necessarily considered deep disturbance. Alterations can be considered to be extensive or widespread when they have affected a large area, usually defined as the majority of a property.

“Archaeological potential” is a term used to describe the likelihood that a property contains archaeological resources. This checklist is intended to assist non-specialists screening for the archaeological potential of a property where site alteration is proposed.

Note: for projects seeking a Renewable Energy Approval under Ontario Regulation 359/09, the Ministry of Tourism and Culture has developed a separate checklist to address the requirements of that regulation.

|                               |                                                                                                  |
|-------------------------------|--------------------------------------------------------------------------------------------------|
| Project Name                  | Markham Stormwater Management Facilities Retrofit Study Municipal Class Environmental Assessment |
| Project Location              | Fairtree Subdivision South Pond                                                                  |
| Proponent Name                | The City of Markham                                                                              |
| Proponent Contact Information |                                                                                                  |

| Known Archaeological Sites                                                                                                                                                 | Yes                                 | Unknown                             | No                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 1. Known archaeological sites within 300 m of property                                                                                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Physical Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 2. Body of water within 300 m of property<br>If yes, what kind of water?                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| a) Primary water source (lake, river, large creek, etc.)                                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| b) Secondary water source (stream, spring, marsh, swamp, etc.)                                                                                                             | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| c) Past water source (beach ridge, river bed, relic creek, ancient shoreline, etc.)                                                                                        | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 3. Topographical features on property<br>(knolls, drumlins, eskers, or plateaus)                                                                                           | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 4. Pockets of sandy soil (50 m <sup>2</sup> or larger) in a clay or rocky area on property                                                                                 | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 5. Distinctive land formations on property<br>(mounds, caverns, waterfalls, peninsulas, etc.)                                                                              | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Cultural Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 6. Known burial site or cemetery on or adjacent to the property<br>(cemetery is registered with the Cemeteries Regulation Unit)                                            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 7. Food or scarce resource harvest areas on property<br>(traditional fishing locations, agricultural/berry extraction areas, etc.)                                         | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 8. Indications of early Euro-Canadian settlement within 300 m of property<br>(monuments, cemeteries, structures, etc.)                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 9. Early historic transportation routes within 100 m of property<br>(historic road, trail, portage, rail corridor, etc.)                                                   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Property-specific Information                                                                                                                                              | Yes                                 | Unknown                             | No                                  |
| 10. Property is designated and/or listed under the <i>Ontario Heritage Act</i><br>(municipal register and lands described in Reg. 875 of the <i>Ontario Heritage Act</i> ) | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 11. Local knowledge of archaeological potential of property<br>(from aboriginal communities, heritage organisations, municipal heritage committees, etc.)                  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 12. Recent deep ground disturbance <sup>†</sup><br>(post-1960, widespread and deep land alterations)                                                                       | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |

<sup>†</sup> Archaeological potential can be determined not to be present for either the entire property or a part(s) of it when the area under consideration has been subject to widespread and deep land alterations that have severely damaged the integrity of any archaeological resources. Deep disturbance may include quarrying or major underground infrastructure development. Activities such as agricultural cultivation, gardening, minor grading and landscaping are not necessarily considered deep disturbance. Alterations can be considered to be extensive or widespread when they have affected a large area, usually defined as the majority of a property.



“Archaeological potential” is a term used to describe the likelihood that a property contains archaeological resources. This checklist is intended to assist non-specialists screening for the archaeological potential of a property where site alteration is proposed.

Note: for projects seeking a Renewable Energy Approval under Ontario Regulation 359/09, the Ministry of Tourism and Culture has developed a separate checklist to address the requirements of that regulation.

|                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------|
| Project Name<br><b>Markham Stormwater Management Facilities Retrofit Study Municipal Class Environmental Assessment</b> |
| Project Location<br><b>Uncontrolled Outlet 8</b>                                                                        |
| Proponent Name<br><b>The City of Markham</b>                                                                            |
| Proponent Contact Information                                                                                           |

| Known Archaeological Sites                                                                                                                                                 | Yes                                 | Unknown                             | No                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 1. Known archaeological sites within 300 m of property                                                                                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Physical Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 2. Body of water within 300 m of property<br>If yes, what kind of water?                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| a) Primary water source (lake, river, large creek, etc.)                                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| b) Secondary water source (stream, spring, marsh, swamp, etc.)                                                                                                             | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| c) Past water source (beach ridge, river bed, relic creek, ancient shoreline, etc.)                                                                                        | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 3. Topographical features on property<br>(knolls, drumlins, eskers, or plateaus)                                                                                           | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 4. Pockets of sandy soil (50 m <sup>2</sup> or larger) in a clay or rocky area on property                                                                                 | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 5. Distinctive land formations on property<br>(mounds, caverns, waterfalls, peninsulas, etc.)                                                                              | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Cultural Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 6. Known burial site or cemetery on or adjacent to the property<br>(cemetery is registered with the Cemeteries Regulation Unit)                                            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 7. Food or scarce resource harvest areas on property<br>(traditional fishing locations, agricultural/berry extraction areas, etc.)                                         | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 8. Indications of early Euro-Canadian settlement within 300 m of property<br>(monuments, cemeteries, structures, etc.)                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 9. Early historic transportation routes within 100 m of property<br>(historic road, trail, portage, rail corridor, etc.)                                                   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Property-specific Information                                                                                                                                              | Yes                                 | Unknown                             | No                                  |
| 10. Property is designated and/or listed under the <i>Ontario Heritage Act</i><br>(municipal register and lands described in Reg. 875 of the <i>Ontario Heritage Act</i> ) | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 11. Local knowledge of archaeological potential of property<br>(from aboriginal communities, heritage organisations, municipal heritage committees, etc.)                  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 12. Recent deep ground disturbance <sup>†</sup><br>(post-1960, widespread and deep land alterations)                                                                       | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |

<sup>†</sup> Archaeological potential can be determined not to be present for either the entire property or a part(s) of it when the area under consideration has been subject to widespread and deep land alterations that have severely damaged the integrity of any archaeological resources. Deep disturbance may include quarrying or major underground infrastructure development. Activities such as agricultural cultivation, gardening, minor grading and landscaping are not necessarily considered deep disturbance. Alterations can be considered to be extensive or widespread when they have affected a large area, usually defined as the majority of a property.

“Archaeological potential” is a term used to describe the likelihood that a property contains archaeological resources. This checklist is intended to assist non-specialists screening for the archaeological potential of a property where site alteration is proposed.

Note: for projects seeking a Renewable Energy Approval under Ontario Regulation 359/09, the Ministry of Tourism and Culture has developed a separate checklist to address the requirements of that regulation.

|                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------|
| Project Name<br><b>Markham Stormwater Management Facilities Retrofit Study Municipal Class Environmental Assessment</b> |
| Project Location<br><b>Uncontrolled Outlet 55</b>                                                                       |
| Proponent Name<br><b>The City of Markham</b>                                                                            |
| Proponent Contact Information                                                                                           |

| Known Archaeological Sites                                                                                                                                                 | Yes                                 | Unknown                             | No                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 1. Known archaeological sites within 300 m of property                                                                                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Physical Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 2. Body of water within 300 m of property<br>If yes, what kind of water?                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| a) Primary water source (lake, river, large creek, etc.)                                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| b) Secondary water source (stream, spring, marsh, swamp, etc.)                                                                                                             | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| c) Past water source (beach ridge, river bed, relic creek, ancient shoreline, etc.)                                                                                        | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 3. Topographical features on property<br>(knolls, drumlins, eskers, or plateaus)                                                                                           | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 4. Pockets of sandy soil (50 m <sup>2</sup> or larger) in a clay or rocky area on property                                                                                 | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 5. Distinctive land formations on property<br>(mounds, caverns, waterfalls, peninsulas, etc.)                                                                              | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Cultural Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 6. Known burial site or cemetery on or adjacent to the property<br>(cemetery is registered with the Cemeteries Regulation Unit)                                            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 7. Food or scarce resource harvest areas on property<br>(traditional fishing locations, agricultural/berry extraction areas, etc.)                                         | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 8. Indications of early Euro-Canadian settlement within 300 m of property<br>(monuments, cemeteries, structures, etc.)                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 9. Early historic transportation routes within 100 m of property<br>(historic road, trail, portage, rail corridor, etc.)                                                   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Property-specific Information                                                                                                                                              | Yes                                 | Unknown                             | No                                  |
| 10. Property is designated and/or listed under the <i>Ontario Heritage Act</i><br>(municipal register and lands described in Reg. 875 of the <i>Ontario Heritage Act</i> ) | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 11. Local knowledge of archaeological potential of property<br>(from aboriginal communities, heritage organisations, municipal heritage committees, etc.)                  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 12. Recent deep ground disturbance <sup>†</sup><br>(post-1960, widespread and deep land alterations)                                                                       | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |

<sup>†</sup> Archaeological potential can be determined not to be present for either the entire property or a part(s) of it when the area under consideration has been subject to widespread and deep land alterations that have severely damaged the integrity of any archaeological resources. Deep disturbance may include quarrying or major underground infrastructure development. Activities such as agricultural cultivation, gardening, minor grading and landscaping are not necessarily considered deep disturbance. Alterations can be considered to be extensive or widespread when they have affected a large area, usually defined as the majority of a property.

“Archaeological potential” is a term used to describe the likelihood that a property contains archaeological resources. This checklist is intended to assist non-specialists screening for the archaeological potential of a property where site alteration is proposed.

Note: for projects seeking a Renewable Energy Approval under Ontario Regulation 359/09, the Ministry of Tourism and Culture has developed a separate checklist to address the requirements of that regulation.

|                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------|
| Project Name<br><b>Markham Stormwater Management Facilities Retrofit Study Municipal Class Environmental Assessment</b> |
| Project Location<br><b>Uncontrolled Outlet 63W</b>                                                                      |
| Proponent Name<br><b>The City of Markham</b>                                                                            |
| Proponent Contact Information                                                                                           |

| Known Archaeological Sites                                                                                                                                                 | Yes                                 | Unknown                             | No                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 1. Known archaeological sites within 300 m of property                                                                                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Physical Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 2. Body of water within 300 m of property<br>If yes, what kind of water?                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| a) Primary water source (lake, river, large creek, etc.)                                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| b) Secondary water source (stream, spring, marsh, swamp, etc.)                                                                                                             | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| c) Past water source (beach ridge, river bed, relic creek, ancient shoreline, etc.)                                                                                        | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 3. Topographical features on property<br>(knolls, drumlins, eskers, or plateaus)                                                                                           | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 4. Pockets of sandy soil (50 m <sup>2</sup> or larger) in a clay or rocky area on property                                                                                 | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 5. Distinctive land formations on property<br>(mounds, caverns, waterfalls, peninsulas, etc.)                                                                              | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Cultural Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 6. Known burial site or cemetery on or adjacent to the property<br>(cemetery is registered with the Cemeteries Regulation Unit)                                            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 7. Food or scarce resource harvest areas on property<br>(traditional fishing locations, agricultural/berry extraction areas, etc.)                                         | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 8. Indications of early Euro-Canadian settlement within 300 m of property<br>(monuments, cemeteries, structures, etc.)                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 9. Early historic transportation routes within 100 m of property<br>(historic road, trail, portage, rail corridor, etc.)                                                   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Property-specific Information                                                                                                                                              | Yes                                 | Unknown                             | No                                  |
| 10. Property is designated and/or listed under the <i>Ontario Heritage Act</i><br>(municipal register and lands described in Reg. 875 of the <i>Ontario Heritage Act</i> ) | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 11. Local knowledge of archaeological potential of property<br>(from aboriginal communities, heritage organisations, municipal heritage committees, etc.)                  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 12. Recent deep ground disturbance <sup>†</sup><br>(post-1960, widespread and deep land alterations)                                                                       | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |

<sup>†</sup> Archaeological potential can be determined not to be present for either the entire property or a part(s) of it when the area under consideration has been subject to widespread and deep land alterations that have severely damaged the integrity of any archaeological resources. Deep disturbance may include quarrying or major underground infrastructure development. Activities such as agricultural cultivation, gardening, minor grading and landscaping are not necessarily considered deep disturbance. Alterations can be considered to be extensive or widespread when they have affected a large area, usually defined as the majority of a property.



“Archaeological potential” is a term used to describe the likelihood that a property contains archaeological resources. This checklist is intended to assist non-specialists screening for the archaeological potential of a property where site alteration is proposed.

Note: for projects seeking a Renewable Energy Approval under Ontario Regulation 359/09, the Ministry of Tourism and Culture has developed a separate checklist to address the requirements of that regulation.

|                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------|
| Project Name<br><b>Markham Stormwater Management Facilities Retrofit Study Municipal Class Environmental Assessment</b> |
| Project Location<br><b>Uncontrolled Outlet 67</b>                                                                       |
| Proponent Name<br><b>The City of Markham</b>                                                                            |
| Proponent Contact Information                                                                                           |

| Known Archaeological Sites                                                                                                                                                 | Yes                                 | Unknown                             | No                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 1. Known archaeological sites within 300 m of property                                                                                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Physical Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 2. Body of water within 300 m of property<br>If yes, what kind of water?                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| a) Primary water source (lake, river, large creek, etc.)                                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| b) Secondary water source (stream, spring, marsh, swamp, etc.)                                                                                                             | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| c) Past water source (beach ridge, river bed, relic creek, ancient shoreline, etc.)                                                                                        | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 3. Topographical features on property<br>(knolls, drumlins, eskers, or plateaus)                                                                                           | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 4. Pockets of sandy soil (50 m <sup>2</sup> or larger) in a clay or rocky area on property                                                                                 | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 5. Distinctive land formations on property<br>(mounds, caverns, waterfalls, peninsulas, etc.)                                                                              | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Cultural Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 6. Known burial site or cemetery on or adjacent to the property<br>(cemetery is registered with the Cemeteries Regulation Unit)                                            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 7. Food or scarce resource harvest areas on property<br>(traditional fishing locations, agricultural/berry extraction areas, etc.)                                         | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 8. Indications of early Euro-Canadian settlement within 300 m of property<br>(monuments, cemeteries, structures, etc.)                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 9. Early historic transportation routes within 100 m of property<br>(historic road, trail, portage, rail corridor, etc.)                                                   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Property-specific Information                                                                                                                                              | Yes                                 | Unknown                             | No                                  |
| 10. Property is designated and/or listed under the <i>Ontario Heritage Act</i><br>(municipal register and lands described in Reg. 875 of the <i>Ontario Heritage Act</i> ) | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 11. Local knowledge of archaeological potential of property<br>(from aboriginal communities, heritage organisations, municipal heritage committees, etc.)                  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 12. Recent deep ground disturbance <sup>†</sup><br>(post-1960, widespread and deep land alterations)                                                                       | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |

<sup>†</sup> Archaeological potential can be determined not to be present for either the entire property or a part(s) of it when the area under consideration has been subject to widespread and deep land alterations that have severely damaged the integrity of any archaeological resources. Deep disturbance may include quarrying or major underground infrastructure development. Activities such as agricultural cultivation, gardening, minor grading and landscaping are not necessarily considered deep disturbance. Alterations can be considered to be extensive or widespread when they have affected a large area, usually defined as the majority of a property.

“Archaeological potential” is a term used to describe the likelihood that a property contains archaeological resources. This checklist is intended to assist non-specialists screening for the archaeological potential of a property where site alteration is proposed.

Note: for projects seeking a Renewable Energy Approval under Ontario Regulation 359/09, the Ministry of Tourism and Culture has developed a separate checklist to address the requirements of that regulation.

|                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------|
| Project Name<br><b>Markham Stormwater Management Facilities Retrofit Study Municipal Class Environmental Assessment</b> |
| Project Location<br><b>Uncontrolled Outlet 94</b>                                                                       |
| Proponent Name<br><b>The City of Markham</b>                                                                            |
| Proponent Contact Information                                                                                           |

| Known Archaeological Sites                                                                                                                                                 | Yes                                 | Unknown                             | No                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 1. Known archaeological sites within 300 m of property                                                                                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Physical Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 2. Body of water within 300 m of property<br>If yes, what kind of water?                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| a) Primary water source (lake, river, large creek, etc.)                                                                                                                   | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| b) Secondary water source (stream, spring, marsh, swamp, etc.)                                                                                                             | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| c) Past water source (beach ridge, river bed, relic creek, ancient shoreline, etc.)                                                                                        | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 3. Topographical features on property<br>(knolls, drumlins, eskers, or plateaus)                                                                                           | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 4. Pockets of sandy soil (50 m <sup>2</sup> or larger) in a clay or rocky area on property                                                                                 | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 5. Distinctive land formations on property<br>(mounds, caverns, waterfalls, peninsulas, etc.)                                                                              | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Cultural Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 6. Known burial site or cemetery on or adjacent to the property<br>(cemetery is registered with the Cemeteries Regulation Unit)                                            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 7. Food or scarce resource harvest areas on property<br>(traditional fishing locations, agricultural/berry extraction areas, etc.)                                         | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 8. Indications of early Euro-Canadian settlement within 300 m of property<br>(monuments, cemeteries, structures, etc.)                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 9. Early historic transportation routes within 100 m of property<br>(historic road, trail, portage, rail corridor, etc.)                                                   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Property-specific Information                                                                                                                                              | Yes                                 | Unknown                             | No                                  |
| 10. Property is designated and/or listed under the <i>Ontario Heritage Act</i><br>(municipal register and lands described in Reg. 875 of the <i>Ontario Heritage Act</i> ) | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 11. Local knowledge of archaeological potential of property<br>(from aboriginal communities, heritage organisations, municipal heritage committees, etc.)                  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 12. Recent deep ground disturbance <sup>†</sup><br>(post-1960, widespread and deep land alterations)                                                                       | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |

<sup>†</sup> Archaeological potential can be determined not to be present for either the entire property or a part(s) of it when the area under consideration has been subject to widespread and deep land alterations that have severely damaged the integrity of any archaeological resources. Deep disturbance may include quarrying or major underground infrastructure development. Activities such as agricultural cultivation, gardening, minor grading and landscaping are not necessarily considered deep disturbance. Alterations can be considered to be extensive or widespread when they have affected a large area, usually defined as the majority of a property.

“Archaeological potential” is a term used to describe the likelihood that a property contains archaeological resources. This checklist is intended to assist non-specialists screening for the archaeological potential of a property where site alteration is proposed.

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|                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------|
| Project Name<br><b>Markham Stormwater Management Facilities Retrofit Study Municipal Class Environmental Assessment</b> |
| Project Location<br><b>Uncontrolled Outlet 103</b>                                                                      |
| Proponent Name<br><b>The City of Markham</b>                                                                            |
| Proponent Contact Information                                                                                           |

| Known Archaeological Sites                                                                                                                                                 | Yes                                 | Unknown                             | No                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 1. Known archaeological sites within 300 m of property                                                                                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Physical Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 2. Body of water within 300 m of property<br>If yes, what kind of water?                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| a) Primary water source (lake, river, large creek, etc.)                                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| b) Secondary water source (stream, spring, marsh, swamp, etc.)                                                                                                             | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| c) Past water source (beach ridge, river bed, relic creek, ancient shoreline, etc.)                                                                                        | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 3. Topographical features on property<br>(knolls, drumlins, eskers, or plateaus)                                                                                           | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 4. Pockets of sandy soil (50 m <sup>2</sup> or larger) in a clay or rocky area on property                                                                                 | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 5. Distinctive land formations on property<br>(mounds, caverns, waterfalls, peninsulas, etc.)                                                                              | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Cultural Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 6. Known burial site or cemetery on or adjacent to the property<br>(cemetery is registered with the Cemeteries Regulation Unit)                                            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 7. Food or scarce resource harvest areas on property<br>(traditional fishing locations, agricultural/berry extraction areas, etc.)                                         | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 8. Indications of early Euro-Canadian settlement within 300 m of property<br>(monuments, cemeteries, structures, etc.)                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 9. Early historic transportation routes within 100 m of property<br>(historic road, trail, portage, rail corridor, etc.)                                                   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Property-specific Information                                                                                                                                              | Yes                                 | Unknown                             | No                                  |
| 10. Property is designated and/or listed under the <i>Ontario Heritage Act</i><br>(municipal register and lands described in Reg. 875 of the <i>Ontario Heritage Act</i> ) | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 11. Local knowledge of archaeological potential of property<br>(from aboriginal communities, heritage organisations, municipal heritage committees, etc.)                  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 12. Recent deep ground disturbance <sup>†</sup><br>(post-1960, widespread and deep land alterations)                                                                       | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |

<sup>†</sup> Archaeological potential can be determined not to be present for either the entire property or a part(s) of it when the area under consideration has been subject to widespread and deep land alterations that have severely damaged the integrity of any archaeological resources. Deep disturbance may include quarrying or major underground infrastructure development. Activities such as agricultural cultivation, gardening, minor grading and landscaping are not necessarily considered deep disturbance. Alterations can be considered to be extensive or widespread when they have affected a large area, usually defined as the majority of a property.



“Archaeological potential” is a term used to describe the likelihood that a property contains archaeological resources. This checklist is intended to assist non-specialists screening for the archaeological potential of a property where site alteration is proposed.

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|                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------|
| Project Name<br><b>Markham Stormwater Management Facilities Retrofit Study Municipal Class Environmental Assessment</b> |
| Project Location<br><b>Uncontrolled Outlet 105</b>                                                                      |
| Proponent Name<br><b>The City of Markham</b>                                                                            |
| Proponent Contact Information                                                                                           |

| Known Archaeological Sites                                                                                                                                                 | Yes                                 | Unknown                             | No                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 1. Known archaeological sites within 300 m of property                                                                                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Physical Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 2. Body of water within 300 m of property<br>If yes, what kind of water?                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| a) Primary water source (lake, river, large creek, etc.)                                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| b) Secondary water source (stream, spring, marsh, swamp, etc.)                                                                                                             | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| c) Past water source (beach ridge, river bed, relic creek, ancient shoreline, etc.)                                                                                        | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 3. Topographical features on property<br>(knolls, drumlins, eskers, or plateaus)                                                                                           | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 4. Pockets of sandy soil (50 m <sup>2</sup> or larger) in a clay or rocky area on property                                                                                 | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 5. Distinctive land formations on property<br>(mounds, caverns, waterfalls, peninsulas, etc.)                                                                              | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Cultural Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 6. Known burial site or cemetery on or adjacent to the property<br>(cemetery is registered with the Cemeteries Regulation Unit)                                            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 7. Food or scarce resource harvest areas on property<br>(traditional fishing locations, agricultural/berry extraction areas, etc.)                                         | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 8. Indications of early Euro-Canadian settlement within 300 m of property<br>(monuments, cemeteries, structures, etc.)                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 9. Early historic transportation routes within 100 m of property<br>(historic road, trail, portage, rail corridor, etc.)                                                   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Property-specific Information                                                                                                                                              | Yes                                 | Unknown                             | No                                  |
| 10. Property is designated and/or listed under the <i>Ontario Heritage Act</i><br>(municipal register and lands described in Reg. 875 of the <i>Ontario Heritage Act</i> ) | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 11. Local knowledge of archaeological potential of property<br>(from aboriginal communities, heritage organisations, municipal heritage committees, etc.)                  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 12. Recent deep ground disturbance <sup>†</sup><br>(post-1960, widespread and deep land alterations)                                                                       | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |

<sup>†</sup> Archaeological potential can be determined not to be present for either the entire property or a part(s) of it when the area under consideration has been subject to widespread and deep land alterations that have severely damaged the integrity of any archaeological resources. Deep disturbance may include quarrying or major underground infrastructure development. Activities such as agricultural cultivation, gardening, minor grading and landscaping are not necessarily considered deep disturbance. Alterations can be considered to be extensive or widespread when they have affected a large area, usually defined as the majority of a property.

“Archaeological potential” is a term used to describe the likelihood that a property contains archaeological resources. This checklist is intended to assist non-specialists screening for the archaeological potential of a property where site alteration is proposed.

Note: for projects seeking a Renewable Energy Approval under Ontario Regulation 359/09, the Ministry of Tourism and Culture has developed a separate checklist to address the requirements of that regulation.

|                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------|
| Project Name<br><b>Markham Stormwater Management Facilities Retrofit Study Municipal Class Environmental Assessment</b> |
| Project Location<br><b>Uncontrolled Outlet 106</b>                                                                      |
| Proponent Name<br><b>The City of Markham</b>                                                                            |
| Proponent Contact Information                                                                                           |

| Known Archaeological Sites                                                                                                                                                 | Yes                                 | Unknown                             | No                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 1. Known archaeological sites within 300 m of property                                                                                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Physical Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 2. Body of water within 300 m of property<br>If yes, what kind of water?                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| a) Primary water source (lake, river, large creek, etc.)                                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| b) Secondary water source (stream, spring, marsh, swamp, etc.)                                                                                                             | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| c) Past water source (beach ridge, river bed, relic creek, ancient shoreline, etc.)                                                                                        | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 3. Topographical features on property<br>(knolls, drumlins, eskers, or plateaus)                                                                                           | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 4. Pockets of sandy soil (50 m <sup>2</sup> or larger) in a clay or rocky area on property                                                                                 | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 5. Distinctive land formations on property<br>(mounds, caverns, waterfalls, peninsulas, etc.)                                                                              | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Cultural Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 6. Known burial site or cemetery on or adjacent to the property<br>(cemetery is registered with the Cemeteries Regulation Unit)                                            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 7. Food or scarce resource harvest areas on property<br>(traditional fishing locations, agricultural/berry extraction areas, etc.)                                         | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 8. Indications of early Euro-Canadian settlement within 300 m of property<br>(monuments, cemeteries, structures, etc.)                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 9. Early historic transportation routes within 100 m of property<br>(historic road, trail, portage, rail corridor, etc.)                                                   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Property-specific Information                                                                                                                                              | Yes                                 | Unknown                             | No                                  |
| 10. Property is designated and/or listed under the <i>Ontario Heritage Act</i><br>(municipal register and lands described in Reg. 875 of the <i>Ontario Heritage Act</i> ) | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 11. Local knowledge of archaeological potential of property<br>(from aboriginal communities, heritage organisations, municipal heritage committees, etc.)                  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 12. Recent deep ground disturbance <sup>†</sup><br>(post-1960, widespread and deep land alterations)                                                                       | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |

<sup>†</sup> Archaeological potential can be determined not to be present for either the entire property or a part(s) of it when the area under consideration has been subject to widespread and deep land alterations that have severely damaged the integrity of any archaeological resources. Deep disturbance may include quarrying or major underground infrastructure development. Activities such as agricultural cultivation, gardening, minor grading and landscaping are not necessarily considered deep disturbance. Alterations can be considered to be extensive or widespread when they have affected a large area, usually defined as the majority of a property.

“Archaeological potential” is a term used to describe the likelihood that a property contains archaeological resources. This checklist is intended to assist non-specialists screening for the archaeological potential of a property where site alteration is proposed.

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|                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------|
| Project Name<br><b>Markham Stormwater Management Facilities Retrofit Study Municipal Class Environmental Assessment</b> |
| Project Location<br><b>Uncontrolled Outlet 112</b>                                                                      |
| Proponent Name<br><b>The City of Markham</b>                                                                            |
| Proponent Contact Information                                                                                           |

| Known Archaeological Sites                                                                                                                                                 | Yes                                 | Unknown                             | No                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 1. Known archaeological sites within 300 m of property                                                                                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Physical Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 2. Body of water within 300 m of property<br>If yes, what kind of water?                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| a) Primary water source (lake, river, large creek, etc.)                                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| b) Secondary water source (stream, spring, marsh, swamp, etc.)                                                                                                             | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| c) Past water source (beach ridge, river bed, relic creek, ancient shoreline, etc.)                                                                                        | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 3. Topographical features on property<br>(knolls, drumlins, eskers, or plateaus)                                                                                           | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 4. Pockets of sandy soil (50 m <sup>2</sup> or larger) in a clay or rocky area on property                                                                                 | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 5. Distinctive land formations on property<br>(mounds, caverns, waterfalls, peninsulas, etc.)                                                                              | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Cultural Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 6. Known burial site or cemetery on or adjacent to the property<br>(cemetery is registered with the Cemeteries Regulation Unit)                                            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 7. Food or scarce resource harvest areas on property<br>(traditional fishing locations, agricultural/berry extraction areas, etc.)                                         | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 8. Indications of early Euro-Canadian settlement within 300 m of property<br>(monuments, cemeteries, structures, etc.)                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 9. Early historic transportation routes within 100 m of property<br>(historic road, trail, portage, rail corridor, etc.)                                                   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Property-specific Information                                                                                                                                              | Yes                                 | Unknown                             | No                                  |
| 10. Property is designated and/or listed under the <i>Ontario Heritage Act</i><br>(municipal register and lands described in Reg. 875 of the <i>Ontario Heritage Act</i> ) | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 11. Local knowledge of archaeological potential of property<br>(from aboriginal communities, heritage organisations, municipal heritage committees, etc.)                  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 12. Recent deep ground disturbance <sup>†</sup><br>(post-1960, widespread and deep land alterations)                                                                       | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |

<sup>†</sup> Archaeological potential can be determined not to be present for either the entire property or a part(s) of it when the area under consideration has been subject to widespread and deep land alterations that have severely damaged the integrity of any archaeological resources. Deep disturbance may include quarrying or major underground infrastructure development. Activities such as agricultural cultivation, gardening, minor grading and landscaping are not necessarily considered deep disturbance. Alterations can be considered to be extensive or widespread when they have affected a large area, usually defined as the majority of a property.



“Archaeological potential” is a term used to describe the likelihood that a property contains archaeological resources. This checklist is intended to assist non-specialists screening for the archaeological potential of a property where site alteration is proposed.

Note: for projects seeking a Renewable Energy Approval under Ontario Regulation 359/09, the Ministry of Tourism and Culture has developed a separate checklist to address the requirements of that regulation.

|                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------|
| Project Name<br><b>Markham Stormwater Management Facilities Retrofit Study Municipal Class Environmental Assessment</b> |
| Project Location<br><b>Uncontrolled Outlet 134</b>                                                                      |
| Proponent Name<br><b>The City of Markham</b>                                                                            |
| Proponent Contact Information                                                                                           |

| Known Archaeological Sites                                                                                                                                                 | Yes                                 | Unknown                             | No                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 1. Known archaeological sites within 300 m of property                                                                                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Physical Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 2. Body of water within 300 m of property<br>If yes, what kind of water?                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| a) Primary water source (lake, river, large creek, etc.)                                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| b) Secondary water source (stream, spring, marsh, swamp, etc.)                                                                                                             | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| c) Past water source (beach ridge, river bed, relic creek, ancient shoreline, etc.)                                                                                        | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 3. Topographical features on property<br>(knolls, drumlins, eskers, or plateaus)                                                                                           | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 4. Pockets of sandy soil (50 m <sup>2</sup> or larger) in a clay or rocky area on property                                                                                 | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 5. Distinctive land formations on property<br>(mounds, caverns, waterfalls, peninsulas, etc.)                                                                              | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Cultural Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 6. Known burial site or cemetery on or adjacent to the property<br>(cemetery is registered with the Cemeteries Regulation Unit)                                            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 7. Food or scarce resource harvest areas on property<br>(traditional fishing locations, agricultural/berry extraction areas, etc.)                                         | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 8. Indications of early Euro-Canadian settlement within 300 m of property<br>(monuments, cemeteries, structures, etc.)                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 9. Early historic transportation routes within 100 m of property<br>(historic road, trail, portage, rail corridor, etc.)                                                   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Property-specific Information                                                                                                                                              | Yes                                 | Unknown                             | No                                  |
| 10. Property is designated and/or listed under the <i>Ontario Heritage Act</i><br>(municipal register and lands described in Reg. 875 of the <i>Ontario Heritage Act</i> ) | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 11. Local knowledge of archaeological potential of property<br>(from aboriginal communities, heritage organisations, municipal heritage committees, etc.)                  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 12. Recent deep ground disturbance <sup>†</sup><br>(post-1960, widespread and deep land alterations)                                                                       | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |

<sup>†</sup> Archaeological potential can be determined not to be present for either the entire property or a part(s) of it when the area under consideration has been subject to widespread and deep land alterations that have severely damaged the integrity of any archaeological resources. Deep disturbance may include quarrying or major underground infrastructure development. Activities such as agricultural cultivation, gardening, minor grading and landscaping are not necessarily considered deep disturbance. Alterations can be considered to be extensive or widespread when they have affected a large area, usually defined as the majority of a property.

“Archaeological potential” is a term used to describe the likelihood that a property contains archaeological resources. This checklist is intended to assist non-specialists screening for the archaeological potential of a property where site alteration is proposed.

Note: for projects seeking a Renewable Energy Approval under Ontario Regulation 359/09, the Ministry of Tourism and Culture has developed a separate checklist to address the requirements of that regulation.

|                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------|
| Project Name<br><b>Markham Stormwater Management Facilities Retrofit Study Municipal Class Environmental Assessment</b> |
| Project Location<br><b>Uncontrolled Outlet 159</b>                                                                      |
| Proponent Name<br><b>The City of Markham</b>                                                                            |
| Proponent Contact Information                                                                                           |

| Known Archaeological Sites                                                                                                                                                 | Yes                                 | Unknown                             | No                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 1. Known archaeological sites within 300 m of property                                                                                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Physical Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 2. Body of water within 300 m of property<br>If yes, what kind of water?                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| a) Primary water source (lake, river, large creek, etc.)                                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| b) Secondary water source (stream, spring, marsh, swamp, etc.)                                                                                                             | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| c) Past water source (beach ridge, river bed, relic creek, ancient shoreline, etc.)                                                                                        | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 3. Topographical features on property<br>(knolls, drumlins, eskers, or plateaus)                                                                                           | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 4. Pockets of sandy soil (50 m <sup>2</sup> or larger) in a clay or rocky area on property                                                                                 | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 5. Distinctive land formations on property<br>(mounds, caverns, waterfalls, peninsulas, etc.)                                                                              | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Cultural Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 6. Known burial site or cemetery on or adjacent to the property<br>(cemetery is registered with the Cemeteries Regulation Unit)                                            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 7. Food or scarce resource harvest areas on property<br>(traditional fishing locations, agricultural/berry extraction areas, etc.)                                         | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 8. Indications of early Euro-Canadian settlement within 300 m of property<br>(monuments, cemeteries, structures, etc.)                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 9. Early historic transportation routes within 100 m of property<br>(historic road, trail, portage, rail corridor, etc.)                                                   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Property-specific Information                                                                                                                                              | Yes                                 | Unknown                             | No                                  |
| 10. Property is designated and/or listed under the <i>Ontario Heritage Act</i><br>(municipal register and lands described in Reg. 875 of the <i>Ontario Heritage Act</i> ) | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 11. Local knowledge of archaeological potential of property<br>(from aboriginal communities, heritage organisations, municipal heritage committees, etc.)                  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 12. Recent deep ground disturbance <sup>†</sup><br>(post-1960, widespread and deep land alterations)                                                                       | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |

<sup>†</sup> Archaeological potential can be determined not to be present for either the entire property or a part(s) of it when the area under consideration has been subject to widespread and deep land alterations that have severely damaged the integrity of any archaeological resources. Deep disturbance may include quarrying or major underground infrastructure development. Activities such as agricultural cultivation, gardening, minor grading and landscaping are not necessarily considered deep disturbance. Alterations can be considered to be extensive or widespread when they have affected a large area, usually defined as the majority of a property.

“Archaeological potential” is a term used to describe the likelihood that a property contains archaeological resources. This checklist is intended to assist non-specialists screening for the archaeological potential of a property where site alteration is proposed.

Note: for projects seeking a Renewable Energy Approval under Ontario Regulation 359/09, the Ministry of Tourism and Culture has developed a separate checklist to address the requirements of that regulation.

|                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------|
| Project Name<br><b>Markham Stormwater Management Facilities Retrofit Study Municipal Class Environmental Assessment</b> |
| Project Location<br><b>Uncontrolled Outlet 162</b>                                                                      |
| Proponent Name<br><b>The City of Markham</b>                                                                            |
| Proponent Contact Information                                                                                           |

| Known Archaeological Sites                                                                                                                                                 | Yes                                 | Unknown                             | No                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 1. Known archaeological sites within 300 m of property                                                                                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Physical Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 2. Body of water within 300 m of property<br>If yes, what kind of water?                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| a) Primary water source (lake, river, large creek, etc.)                                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| b) Secondary water source (stream, spring, marsh, swamp, etc.)                                                                                                             | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| c) Past water source (beach ridge, river bed, relic creek, ancient shoreline, etc.)                                                                                        | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 3. Topographical features on property<br>(knolls, drumlins, eskers, or plateaus)                                                                                           | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 4. Pockets of sandy soil (50 m <sup>2</sup> or larger) in a clay or rocky area on property                                                                                 | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 5. Distinctive land formations on property<br>(mounds, caverns, waterfalls, peninsulas, etc.)                                                                              | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Cultural Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 6. Known burial site or cemetery on or adjacent to the property<br>(cemetery is registered with the Cemeteries Regulation Unit)                                            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 7. Food or scarce resource harvest areas on property<br>(traditional fishing locations, agricultural/berry extraction areas, etc.)                                         | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 8. Indications of early Euro-Canadian settlement within 300 m of property<br>(monuments, cemeteries, structures, etc.)                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 9. Early historic transportation routes within 100 m of property<br>(historic road, trail, portage, rail corridor, etc.)                                                   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Property-specific Information                                                                                                                                              | Yes                                 | Unknown                             | No                                  |
| 10. Property is designated and/or listed under the <i>Ontario Heritage Act</i><br>(municipal register and lands described in Reg. 875 of the <i>Ontario Heritage Act</i> ) | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 11. Local knowledge of archaeological potential of property<br>(from aboriginal communities, heritage organisations, municipal heritage committees, etc.)                  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 12. Recent deep ground disturbance <sup>†</sup><br>(post-1960, widespread and deep land alterations)                                                                       | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |

<sup>†</sup> Archaeological potential can be determined not to be present for either the entire property or a part(s) of it when the area under consideration has been subject to widespread and deep land alterations that have severely damaged the integrity of any archaeological resources. Deep disturbance may include quarrying or major underground infrastructure development. Activities such as agricultural cultivation, gardening, minor grading and landscaping are not necessarily considered deep disturbance. Alterations can be considered to be extensive or widespread when they have affected a large area, usually defined as the majority of a property.



“Archaeological potential” is a term used to describe the likelihood that a property contains archaeological resources. This checklist is intended to assist non-specialists screening for the archaeological potential of a property where site alteration is proposed.

Note: for projects seeking a Renewable Energy Approval under Ontario Regulation 359/09, the Ministry of Tourism and Culture has developed a separate checklist to address the requirements of that regulation.

|                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------|
| Project Name<br><b>Markham Stormwater Management Facilities Retrofit Study Municipal Class Environmental Assessment</b> |
| Project Location<br><b>Uncontrolled Outlet 163</b>                                                                      |
| Proponent Name<br><b>The City of Markham</b>                                                                            |
| Proponent Contact Information                                                                                           |

| Known Archaeological Sites                                                                                                                                                 | Yes                                 | Unknown                             | No                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 1. Known archaeological sites within 300 m of property                                                                                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Physical Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 2. Body of water within 300 m of property<br>If yes, what kind of water?                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| a) Primary water source (lake, river, large creek, etc.)                                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| b) Secondary water source (stream, spring, marsh, swamp, etc.)                                                                                                             | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| c) Past water source (beach ridge, river bed, relic creek, ancient shoreline, etc.)                                                                                        | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 3. Topographical features on property<br>(knolls, drumlins, eskers, or plateaus)                                                                                           | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 4. Pockets of sandy soil (50 m <sup>2</sup> or larger) in a clay or rocky area on property                                                                                 | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 5. Distinctive land formations on property<br>(mounds, caverns, waterfalls, peninsulas, etc.)                                                                              | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Cultural Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 6. Known burial site or cemetery on or adjacent to the property<br>(cemetery is registered with the Cemeteries Regulation Unit)                                            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 7. Food or scarce resource harvest areas on property<br>(traditional fishing locations, agricultural/berry extraction areas, etc.)                                         | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 8. Indications of early Euro-Canadian settlement within 300 m of property<br>(monuments, cemeteries, structures, etc.)                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 9. Early historic transportation routes within 100 m of property<br>(historic road, trail, portage, rail corridor, etc.)                                                   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Property-specific Information                                                                                                                                              | Yes                                 | Unknown                             | No                                  |
| 10. Property is designated and/or listed under the <i>Ontario Heritage Act</i><br>(municipal register and lands described in Reg. 875 of the <i>Ontario Heritage Act</i> ) | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 11. Local knowledge of archaeological potential of property<br>(from aboriginal communities, heritage organisations, municipal heritage committees, etc.)                  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 12. Recent deep ground disturbance <sup>†</sup><br>(post-1960, widespread and deep land alterations)                                                                       | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |

<sup>†</sup> Archaeological potential can be determined not to be present for either the entire property or a part(s) of it when the area under consideration has been subject to widespread and deep land alterations that have severely damaged the integrity of any archaeological resources. Deep disturbance may include quarrying or major underground infrastructure development. Activities such as agricultural cultivation, gardening, minor grading and landscaping are not necessarily considered deep disturbance. Alterations can be considered to be extensive or widespread when they have affected a large area, usually defined as the majority of a property.

“Archaeological potential” is a term used to describe the likelihood that a property contains archaeological resources. This checklist is intended to assist non-specialists screening for the archaeological potential of a property where site alteration is proposed.

Note: for projects seeking a Renewable Energy Approval under Ontario Regulation 359/09, the Ministry of Tourism and Culture has developed a separate checklist to address the requirements of that regulation.

|                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------|
| Project Name<br><b>Markham Stormwater Management Facilities Retrofit Study Municipal Class Environmental Assessment</b> |
| Project Location<br><b>Uncontrolled Outlet 176</b>                                                                      |
| Proponent Name<br><b>The City of Markham</b>                                                                            |
| Proponent Contact Information                                                                                           |

| Known Archaeological Sites                                                                                                                                                 | Yes                                 | Unknown                             | No                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 1. Known archaeological sites within 300 m of property                                                                                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Physical Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 2. Body of water within 300 m of property<br>If yes, what kind of water?                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| a) Primary water source (lake, river, large creek, etc.)                                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| b) Secondary water source (stream, spring, marsh, swamp, etc.)                                                                                                             | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| c) Past water source (beach ridge, river bed, relic creek, ancient shoreline, etc.)                                                                                        | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 3. Topographical features on property<br>(knolls, drumlins, eskers, or plateaus)                                                                                           | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 4. Pockets of sandy soil (50 m <sup>2</sup> or larger) in a clay or rocky area on property                                                                                 | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 5. Distinctive land formations on property<br>(mounds, caverns, waterfalls, peninsulas, etc.)                                                                              | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Cultural Features                                                                                                                                                          | Yes                                 | Unknown                             | No                                  |
| 6. Known burial site or cemetery on or adjacent to the property<br>(cemetery is registered with the Cemeteries Regulation Unit)                                            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 7. Food or scarce resource harvest areas on property<br>(traditional fishing locations, agricultural/berry extraction areas, etc.)                                         | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 8. Indications of early Euro-Canadian settlement within 300 m of property<br>(monuments, cemeteries, structures, etc.)                                                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 9. Early historic transportation routes within 100 m of property<br>(historic road, trail, portage, rail corridor, etc.)                                                   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Property-specific Information                                                                                                                                              | Yes                                 | Unknown                             | No                                  |
| 10. Property is designated and/or listed under the <i>Ontario Heritage Act</i><br>(municipal register and lands described in Reg. 875 of the <i>Ontario Heritage Act</i> ) | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 11. Local knowledge of archaeological potential of property<br>(from aboriginal communities, heritage organisations, municipal heritage committees, etc.)                  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 12. Recent deep ground disturbance <sup>†</sup><br>(post-1960, widespread and deep land alterations)                                                                       | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |

<sup>†</sup> Archaeological potential can be determined not to be present for either the entire property or a part(s) of it when the area under consideration has been subject to widespread and deep land alterations that have severely damaged the integrity of any archaeological resources. Deep disturbance may include quarrying or major underground infrastructure development. Activities such as agricultural cultivation, gardening, minor grading and landscaping are not necessarily considered deep disturbance. Alterations can be considered to be extensive or widespread when they have affected a large area, usually defined as the majority of a property.

**APPENDIX F**  
**Alternative Design Evaluation**



| Table 1 –Evaluation of Conceptual Design Alternatives for Pond #5 (Online Wet Pond) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                      |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Criteria                                                                            | Alternatives for Pond #5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                      |
|                                                                                     | Do Nothing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Retrofit Outlet to Extend Detention                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Bottom Draw Outlet in Wet Pond                                                                                                                                                                                                                                                                                                                       |
| Alternative Description                                                             | <ul style="list-style-type: none"> <li>The pond will continue to function as existing</li> <li>Pond #5 is a wet pond that was built to provide flood control, with a 9.82 ha minor drainage area and a 133.02 ha major drainage area.</li> </ul>                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"> <li>Construct upgraded outlet structure to increase the extended detention within existing SWM facility</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>Construct a bottom draw outlet to reduce temperatures of discharged water.</li> <li>Only applicable if the wetland is converted into a wet pond</li> </ul>                                                                                                                                                    |
| Location in Treatment Train                                                         | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | End of Pipe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                      |
| Target SWM Objective(s)                                                             | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Erosion Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Temperature Control                                                                                                                                                                                                                                                                                                                                  |
| Technical Considerations                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                      |
| Constructability and accessibility                                                  | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"> <li>Existing pond appears to outlet by overtopping the pond berm, with flow concentrated at a low point in the berm. Constructability is low due to lack of adequate additional storage above pond outlet.</li> <li>Constructability is also low due to lack of adequate elevation difference between existing outlet and ultimate drainage point of water that has spilled out of the pond.</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Erosion and sediment control plans</li> </ul>                                  | <ul style="list-style-type: none"> <li>Constructability is low due to lack of adequate infrastructure for this alternative</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Greater depth enhances the thermal mitigation function of the bottom draw outlet</li> </ul>                         |
| Ability to meet stormwater management objective(s)                                  | <ul style="list-style-type: none"> <li>Does not provide for or meet the stormwater management objectives of the City and/or TRCA, for quantity or erosion control</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>No mitigation undertaken</li> </ul>                                                                                                                                                                                                               | <ul style="list-style-type: none"> <li>Provided that adequate volume can be made available, the adjustment of the outlet can be an effective solution to provide the required extended detention</li> <li>Ability to provide adequate erosion control is low due to lack of adequate storage available above the existing outlet</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Retrofit of the outlet would require upgrade of the available storage volume of the facility</li> <li>Erosion control may be facilitated with use of LIDs upstream</li> </ul> | <ul style="list-style-type: none"> <li>Bottom draw outlets can be effective in decreasing the temperature of the outlet water</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Thermal mitigation would be best achieved with a combination of LID methods</li> </ul>                           |
| Engineering best practises / Innovative solution                                    | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"> <li>Typically more traditional SWM approach</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Erosion control may be facilitated with use of LIDs upstream</li> </ul>                                                                                                                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"> <li>Bottom draw outlets in combination with cooling trenches are recent best management practices</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Thermal mitigation can be enhanced overall with LIDs within the contributing watershed</li> </ul>         |
| Summary / Recommendations                                                           | <ul style="list-style-type: none"> <li>Does not provide for or meet the stormwater management objectives of the City and/or TRCA, for quantity or erosion control</li> </ul>                                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"> <li>Due to existing pond storage capacity and outlet constructability would be challenging</li> <li>More supplementary alternatives required to provide adequate quality control</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"> <li>A bottom draw outlet is a recommended outlet alternative for the wet pond to achieve required temperature control</li> <li>However, constructability is challenging due to existing pond conditions</li> </ul>                                                                                                |
| Natural Environment                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                      |
| Impacts to wildlife and vegetation habitats                                         | <ul style="list-style-type: none"> <li>The current condition of wildlife and vegetation habitats will not change; however if the lack of quantity and erosion control causes future erosion in the receiving watercourse or impacts the quality of the water in the watercourse, this could have a negative impact on the future condition of wildlife and vegetation habitats.</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>No mitigation undertaken</li> </ul> | <ul style="list-style-type: none"> <li>Some vegetation will likely be cleared for retrofit of the facility outlet;</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Fisheries and migratory bird timing windows will be adhered to if required;</li> <li>Restoration plans will be developed to restore any cleared vegetation</li> </ul>                                                                                                                                                                                                                       | <ul style="list-style-type: none"> <li>No impact to vegetation</li> <li>May impact aquatic habitat, although fish not anticipated within facility</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Effects could be mitigated with appropriate screens and outflow velocities</li> </ul>        |
| Impacts / Improvements based on SAR / ESA                                           | <ul style="list-style-type: none"> <li>Existing vegetation provides some benefit to reducing water temperature</li> <li>By not implementing temperature controls, receiving waters may have higher temperatures over time and this can negatively impact sensitive species such as Redside Dace</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>No mitigation undertaken</li> </ul>                                                                                 | <ul style="list-style-type: none"> <li>Opportunities exist for cooling water before discharging downstream via outlet structures</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Can be enhanced with LID measures upstream</li> <li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li> </ul>                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>Cooling effects are very beneficial for the potential Redside Dace habitat downstream</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Alternative can be enhanced with LIDs within the watershed and planting techniques within the wet pond</li> </ul> |
| Summary / Recommendations                                                           | <ul style="list-style-type: none"> <li>Existing vegetation of wetland provides some benefit regarding thermal regulation</li> <li>Increasing water temperatures decrease water quality and affect the health of aquatic species</li> <li>Existing aquatic and terrestrial vegetation in the wetland block provide habitat area and will remain in the current condition</li> </ul>                                                                                                                                        | <ul style="list-style-type: none"> <li>Retrofit of the existing outlet will have a low impact to the natural environment</li> <li>If storage volume can be adequately increased, the retrofit of the outlet can provide required erosion control which will increase water quality</li> </ul>                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>Bottom draw outlet is a simple alternative to incorporate into a wet pond for the achievement of temperature control</li> </ul>                                                                                                                                                                               |
| Social Impacts                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                      |
| Requirement of easements or                                                         | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"> <li>Likely not required; block is relatively large and accessible</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | N/A                                                                                                                                                                                                                                                                                                                                                  |

|                                                                             | Alternatives for Pond #5                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                           |
|-----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Criteria                                                                    | Do Nothing                                                                                                                                                                                                                            | Retrofit Outlet to Extend Detention                                                                                                                                                                                                                                                                                                                                                                                                                                        | Bottom Draw Outlet in Wet Pond                                                                                                                                                                                                                                                                            |
| purchase of private lands                                                   |                                                                                                                                                                                                                                       | <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Land requirements would be confirmed through conceptual design</li> </ul>                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                           |
| Impacts to public and private properties due to construction and operations | N/A                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Potential noise and visual impacts associated with construction for the residences backing onto wetland / parkland block</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Construction management plan, including restrictions on hours</li> <li>A staging area should be set up within the municipal parkland as to not interfere with traffic or private property</li> </ul> | <ul style="list-style-type: none"> <li>Impacts are related to the construction of the wet pond</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Bottom draw outlet itself does not present additional impacts</li> </ul>                             |
| Effect on public safety                                                     | N/A                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Retrofit of the outlet itself has low impact on public safety</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Warning signs and fencing (if required) will provide measures of safety</li> </ul>                                                                                                                                                                              | N/A                                                                                                                                                                                                                                                                                                       |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"> <li>The ‘Do Nothing’ alternative has no social impacts</li> </ul>                                                                                                                                  | <ul style="list-style-type: none"> <li>Retrofit of the facility outlet itself is of low impact in regards to noise, traffic and land use</li> <li>Scale of construction is relatively small</li> </ul>                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"> <li>There are no social impacts associated with the bottom draw outlet</li> </ul>                                                                                                                                                                                      |
| Economic Considerations                                                     |                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                           |
| Capital costs                                                               | <ul style="list-style-type: none"> <li>No action may result in greater capital expenses in the future</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not applicable</li> </ul> | <ul style="list-style-type: none"> <li>Low to moderate cost for the retrofit of the outlet itself</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Capital costs can be marginally reduced if the extended detention volume does not increase significantly from existing conditions</li> </ul>                                                                                                                       | <ul style="list-style-type: none"> <li>Low capital cost as standalone item</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>No mitigation required</li> </ul>                                                                                        |
| Maintenance and operating costs                                             | N/A                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Low maintenance cost and frequency; likely seasonally to prevent clogging</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Maintenance frequency should be as directed by operations manual</li> </ul>                                                                                                                                                                         | <ul style="list-style-type: none"> <li>Low maintenance costs as standalone; costs associated with maintenance of wet pond</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Maintenance due to clogging can be reduced with proper screens</li> </ul> |
| Impact on future development and growth                                     | N/A                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>No impacts</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Limited to the existing land use; higher imperviousness in the watershed would require a larger extended detention volume and therefore altered outlet structure</li> </ul>                                                                                                                                        | <ul style="list-style-type: none"> <li>No impacts</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not applicable</li> </ul>                                                                                                                         |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"> <li>‘Do nothing’ may postpone required works and increase future costs</li> </ul>                                                                                                                  | <ul style="list-style-type: none"> <li>Retrofit of the existing outlet to provide the required extended detention is a relatively low cost solution in itself; the corresponding requirement to increase the detention volume will increase the capital cost</li> </ul>                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>Bottom draw outlet is a cost effective alternative to incorporate into wet pond design to meet temperature criteria</li> </ul>                                                                                                                                     |
| Results of Alternative Evaluation                                           | <ul style="list-style-type: none"> <li>This alternative is not preferred because the alternative does not meet the stormwater management objectives</li> </ul>                                                                        | <ul style="list-style-type: none"> <li>Retaining existing trees is a high priority for the City of Markham; however tree loss is probable for construction of this alternative. Therefore, this is not a preferred option.</li> <li></li> </ul>                                                                                                                                                                                                                            | <ul style="list-style-type: none"> <li>This is not a preferred alternative because of the complexity of the retrofit due to the existing outlet infrastructure</li> </ul>                                                                                                                                 |

| Criteria                                           | Alternatives for Pond #5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                    | Cooling Trench                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Aquatic and Riparian Plantings at Facility                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Underground Storage Tanks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Alternative Description                            | <ul style="list-style-type: none"><li>Excavation of a trench between the pond control structure maintenance hole and the outlet</li><li>Modification of outlet piping infrastructure to discharge into trench</li><li>Installation of stone material and restoration of ground surface</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>Plantings to increase density and area of vegetation cover surrounding facility and within facility to provide shade for cooling of detained water</li></ul>                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"><li>Installed in municipal owned lands including parks and the pond land parcel</li><li>Underground storage tanks will capture and detain stormwater and release over an extended time period</li><li>Infiltration type underground tanks will allow for infiltration during detention period</li><li>May need water quality control prior to infiltrating (if infiltration is proposed)</li></ul>                                                                                                                                                                                                                                                                                                             |
| Location in Treatment Train                        | End of Pipe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Target SWM Objective(s)                            | Temperature Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Erosion and Temperature Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Technical Considerations                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Constructability and accessibility                 | <ul style="list-style-type: none"><li>Feasible construction and accessibility may be limited considering railway lands to the north</li><li>Construction footprint is relatively small</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Erosion and sediment control plans required</li></ul>                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>No constructability issues anticipated with adding plantings to proposed facilities</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Plantings enhance temperature control by providing shade</li></ul>                                                                                                                                                                                                     | <ul style="list-style-type: none"><li>Footprint may be large and depends on available soil conditions; constructability is low to moderate</li><li>Still allows for use of land at-grade, so can be proposed under existing recreational land</li><li>Requires re-organization of existing outfalls to feed into central underground tank(s)</li><li>Based on soil mapping, the soil in the drainage area is conducive to infiltration.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Tanks with infiltration capabilities provide additional benefits for erosion and temperature control</li><li>Site specific soil testing is required to confirm suitability of infiltration</li></ul> |
| Ability to meet stormwater management objective(s) | <ul style="list-style-type: none"><li>Cooling trenches can be effective in decreasing the temperature of the outlet water</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Thermal mitigation would be best achieved with a combination of LID methods</li></ul>                                                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>Shade from plantings will reduce the temperature of stormwater at a facility</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Plantings are better used in conjunction with other cooling methods to achieve adequate temperature control</li></ul>                                                                                                                                                         | <ul style="list-style-type: none"><li>Underground tanks, especially with infiltration capabilities, are effective for providing erosion and temperature control</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Longer detention times and depth below grade can enhance the erosion and temperature control, respectively</li></ul>                                                                                                                                                                                                                                                                                                                                                         |
| Engineering best practises / innovative solution   | <ul style="list-style-type: none"><li>Cooling trenches are a recent best management practice</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Thermal mitigation can be enhanced overall with LIDs within the contributing watershed</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"><li>Temperature control of stormwater in general is becoming an engineering best management practice in areas with sensitive habitats</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Effects of plantings can be enhanced with other methods such as use of a bottom draw outlet</li></ul>                                                                                                                    | <ul style="list-style-type: none"><li>Underground tanks, including infiltration, are noted as best management practices</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Maintenance of underground tanks is more extensive than at-grade alternatives</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Summary / Recommendations                          | <ul style="list-style-type: none"><li>Technically feasible with a small construction footprint</li><li>A cooling trench would help with mitigating the temperature impacts of the SWM pond</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"><li>Plantings at stormwater management facility are a simple alternative to provide additional temperature controls</li></ul>                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>Technically feasible, requiring more intrusive maintenance</li><li>Constructability within existing terrain is low to moderate and can be incorporated into existing land uses</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Natural Environment                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Impacts to wildlife and vegetation habitats        | <ul style="list-style-type: none"><li>Existing vegetation in the work area will be cleared</li><li>All affected areas will be restored</li><li>Results in a net neutral effect to terrestrial habitat</li><li>Reduction of temperature released into the downstream cool-water watercourse will improve the native aquatic habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Appropriate erosion and sediment control measures will be undertaken during construction to reduce any negative impacts to the downstream watercourse</li><li>Restoration plans will be developed for surrounding areas impacted by construction</li></ul> | <ul style="list-style-type: none"><li>Planting native species can enhance the existing wildlife and vegetation</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul>                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>Would require removal of some vegetation depending on specific location</li><li>Once installed, less intrusive than other alternatives because of location below grade</li><li>May reduce terrestrial habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Restoration plan required if loss of vegetation expected due to construction</li><li>Migratory bird windows to be adhered to for construction</li></ul>                                                                                                                                                                                                                                  |
| Impacts / improvements based on SAR / ESA          | <ul style="list-style-type: none"><li>There are opportunities to improve the habitat quality of the receiving watercourse by reducing the temperature of flows entering the watercourse</li><li>Cooling effects are very beneficial for Redside Dace habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li></ul>                                                                                                                                                                                                     | <ul style="list-style-type: none"><li>Providing additional shade at stormwater facilities reduces stormwater temperature which is a key benefit for SAR habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Effects of plantings can be enhanced with other methods such as use of a bottom draw outlet</li><li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li></ul> | <ul style="list-style-type: none"><li>Underground tanks may decrease water temperature, providing benefits to the identified SAR</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li></ul>                                                                                                                                                                                                                                                                                                                                                                                |
| Summary / Recommendations                          | <ul style="list-style-type: none"><li>A cooling trench at the pond outlet is a relatively simple alternative to mitigate temperatures impacts of the wet pond for the achievement of temperature control</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>Plantings at stormwater facilities provide positive impacts on the natural environment (provided they are non-invasive species)</li></ul>                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>Underground tanks are a long-term non-invasive alternative for providing erosion and temperature control</li><li>This alternative may be a viable solution to</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |



| Criteria                                                                    | Alternatives for Pond #5                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                             | Cooling Trench                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Aquatic and Riparian Plantings at Facility                                                                                                                                                                                                                                                     | Underground Storage Tanks                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                | provide erosion and temperature control without disruption to the existing wetland                                                                                                                                                                                                                                                                                                                                                                                                 |
| Social Impacts                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Requirement of easements or purchase of private lands                       | <ul style="list-style-type: none"> <li>Not required</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not applicable</li> </ul>                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"> <li>Not applicable (unless required in conjunction with stormwater facility construction)</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not applicable</li> </ul>                                   | <ul style="list-style-type: none"> <li>Sufficient space is available within municipal lands</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Land requirements would be confirmed through conceptual design</li> </ul>                                                                                                                                                                                                        |
| Impacts to public and private properties due to construction and operations | <ul style="list-style-type: none"> <li>Noise and visual impacts associated with construction for the residences backing onto proposed SWM facility block</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Construction management plan, including restrictions on hours may reduce inconveniences associated with construction</li> </ul>                                                                                    | <ul style="list-style-type: none"> <li>No impacts to public</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not applicable</li> </ul>                                                                                                    | <ul style="list-style-type: none"> <li>Construction anticipated within wetland and/or park lands; impacts may include temporary, minor traffic and noise issues due to proximity to residential neighbourhood</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Proper signage and safety measures to be set up for construction period</li> <li>Recreational park land will be available for use after restoration</li> </ul> |
| Effect on public safety                                                     | <ul style="list-style-type: none"> <li>The cooling trench will not have any affects on public safety once constructed</li> <li>During construction there is a potential safety risk due to excavation if a member of the public was to enter the site</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>The construction site should be secured during and after construction hours with warning signs and fencing</li> </ul> | <ul style="list-style-type: none"> <li>Vegetation should be suitable for proposed facility and clearly indicate any water’s edge</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Vegetation at facilities must be maintained</li> </ul>  | <ul style="list-style-type: none"> <li>No public safety concerns beyond construction period</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Proper signage and safety measures to be set up for construction period</li> </ul>                                                                                                                                                                                               |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"> <li>No long term social impacts associated with the cooling trench</li> <li>Minimal disturbance to the public may occur during construction but the construction time frame will be brief</li> </ul>                                                                                                                                                                                                                                           | <ul style="list-style-type: none"> <li>No significant social impacts of plantings at stormwater facilities</li> </ul>                                                                                                                                                                          | <ul style="list-style-type: none"> <li>Underground tanks are proposed to be located in public lands, generally not intrusive to the public during or after construction</li> </ul>                                                                                                                                                                                                                                                                                                 |
| Economic Considerations                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Capital costs                                                               | <ul style="list-style-type: none"> <li>Low capital cost for a relatively small excavation and materials</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Capital costs can be marginally reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required trench volume)</li> </ul>                                                                                                       | <ul style="list-style-type: none"> <li>Low capital cost relative to other alternatives</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Costs may vary depending on extents and types of plantings</li> </ul>                             | <ul style="list-style-type: none"> <li>Moderate capital cost related to storage tank infrastructure</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Efficient tank design to minimize capital costs</li> <li>Adequate soils and extend of earthworks will affect capital cost</li> </ul>                                                                                                                                     |
| Maintenance and operating costs                                             | <ul style="list-style-type: none"> <li>Low maintenance cost associated with cleaning out the trench</li> <li>Lower maintenance frequency; likely once per year, ideally not requiring access to railway lands</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Maintenance frequency should be as directed by operations manual</li> </ul>                                                                                   | <ul style="list-style-type: none"> <li>Low maintenance costs with native, sustainable plantings</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Lower maintenance plants will minimize costs of maintenance and/or replanting</li> </ul> | <ul style="list-style-type: none"> <li>Low maintenance costs associated with cleaning out tanks as per operations manual or in event of clogging</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Can prevent clogging with additional pre-treatment techniques</li> </ul>                                                                                                                                                    |
| Impact on future development and growth                                     | <ul style="list-style-type: none"> <li>No impacts</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not applicable</li> </ul>                                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"> <li>No impact on future development</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not applicable</li> </ul>                                                                                         | <ul style="list-style-type: none"> <li>No impact, but underground tanks would require expansion if contributing land use was to intensify</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>On-site control requirements for any future intensification within the watershed would mitigate further expansion</li> </ul>                                                                                                       |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"> <li>A cooling trench is a cost effective alternative to meet temperature criteria</li> </ul>                                                                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Plantings at SWM facilities are a low cost alternative for providing temperature control</li> </ul>                                                                                                                                                     | <ul style="list-style-type: none"> <li>Underground tanks can provide reasonable capital and maintenance costs for the achievement of erosion and temperature control</li> <li>Capital costs can fluctuate based on actual conditions at the specific location chosen at conceptual design</li> </ul>                                                                                                                                                                               |
| Results of Alternative Evaluation                                           | <ul style="list-style-type: none"> <li>This alternative is not preferred because the preferred alternatives of underground storage and additional plantings will provide adequate temperature control at a lower capital cost than a cooling trench and additional erosion control.</li> </ul>                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>This alternative is preferred because it will improve/maintain existing habitat and vegetation</li> <li>This alternative provides temperature control at a relatively low capital cost.</li> </ul>                                                      | <ul style="list-style-type: none"> <li>This is a preferred alternative because it may be designed such that it minimizes the number of adult trees affected.</li> </ul>                                                                                                                                                                                                                                                                                                            |

| Criteria                                              | Alternatives for Pond #5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                       | Infiltration in Right-of-Ways (R.O.W.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Bioswales                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Expand Size of Existing Pond                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Alternative Description                               | <ul style="list-style-type: none"><li>▪ Install perforated secondary pipe within existing storm sewer systems to allow for infiltration through linear soakaway pits</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"><li>▪ Construct bioswales within the road right-of-ways within the facility drainage area</li><li>▪ Bioswales to contain native plantings and subdrains</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>▪ Expand the existing SWM facility area in terms of volume to provide for adequate permanent pool, active storage, and extended detention</li></ul>                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                       | Conveyance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | End of Pipe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                                                       | Erosion and Temperature Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Erosion Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Technical Considerations                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Constructability and accessibility                    | <ul style="list-style-type: none"><li>▪ Construction area is extensive and many secondary infiltration pipes would require to be installed to achieve SWM criteria</li><li>▪ Requires coordination with existing infrastructure and utilities</li><li>▪ Based on soil mapping, the soil in the drainage area is conducive to infiltration.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Perforated pipes (exfiltration pipes) and soakaway pits may be more suited as supplementary water quality / erosion / temperature control measures, where constructability and retrofit are least disruptive to existing infrastructure</li><li>▪ Site specific soil testing is required to confirm suitability of infiltration</li></ul> | <ul style="list-style-type: none"><li>▪ Construction area is extensive and pipe networks are more intricate, requiring coordination with existing infrastructure</li><li>▪ Road right of ways need to be conducive to grading and space criteria for bioswales</li><li>▪ Based on soil mapping, the soil in the drainage area is conducive to infiltration.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Bioswales may be more suited as supplementary water quality / erosion / temperature control measures, where constructability and retrofit are least disruptive to existing infrastructure</li><li>▪ Site specific soil testing is required to confirm suitability of infiltration</li></ul> | <ul style="list-style-type: none"><li>▪ Moderate constructability due to extend of earthworks and infrastructure</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Efficient design and access plans can mitigate negative effects of constructability of the pond expansion</li></ul>                                                                                                                                                                                                                                  |
| Ability to meet stormwater management objective(s)    | <ul style="list-style-type: none"><li>▪ Perforated pipes (exfiltration pipes) and soakaway pits may are more effective when used within a treatment train to achieve the stormwater objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Additional pre-treatment will enhance the function of the perforated pipes, to reduce clogging</li></ul>                                                                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"><li>▪ Bioswales are more effective when used within a treatment train to achieve the stormwater objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Additional pre-treatment will enhance the function of bioswales, to reduce clogging of the underdrain pipes</li></ul>                                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>▪ Expansion of the facility will provide adequate controls to meet the SWM objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Pre-treatment of stormwater with LIDs can reduce the required expansion volume</li><li>▪ Using the maximum safe slopes will decrease the footprint of the expanded pond</li></ul>                                                                                                                                                         |
| Engineering best practises / innovative solution      | <ul style="list-style-type: none"><li>▪ Perforated pipes (exfiltration pipes) and soakaway pits may are innovative solutions within stormwater management</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Enhanced with further use of LIDs such as vegetated filter strips</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>▪ Bioswales are innovative solutions within stormwater management conveyance systems</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Enhanced with further use of LIDs such as vegetated filter strips</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>▪ Typically more traditional SWM approach</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Can be enhanced with use of LIDs within the contributing watershed</li></ul>                                                                                                                                                                                                                                                                                                          |
| Summary / Recommendations                             | <ul style="list-style-type: none"><li>▪ Perforated pipes (exfiltration pipes) and soakaway pits may are effective as part of a treatment train and where retrofit does not greatly interfere with existing infrastructure</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"><li>▪ Bioswales are effective as part of a treatment train and where retrofit does not greatly interfere with existing infrastructure</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"><li>▪ Constructability generally not an issue; technically feasible; potential negotiations or permits with neighboring railway lands</li></ul>                                                                                                                                                                                                                                                                                                                                                                                           |
| Natural Environment                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Impacts to wildlife and vegetation habitats           | <ul style="list-style-type: none"><li>▪ May require removal of some vegetation depending on specific location; likely few impacts to existing wildlife and vegetation habitats</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Areas disturbed during construction will be restored</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"><li>▪ May require removal of some vegetation depending on specific location</li><li>▪ May present phosphorus issues if not properly designed and/or maintained</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Planted bioswales will enhance neighbourhoods with additional vegetated areas</li></ul>                                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>▪ Expansion of the existing facility will require earthworks within the existing wetland habitat, therefore interfering with existing wildlife and vegetation</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Fisheries and migratory bird timing windows will be adhered to if required; an ecologist/biologist will be consulted due to proximity to existing watercourse</li><li>▪ Restoration plan should be developed</li><li>▪ Likely removal of trees required</li></ul> |
| Impacts / improvements based on SAR / ESA             | <ul style="list-style-type: none"><li>▪ Perforated pipes (exfiltration pipes) may decrease water temperature, providing benefits to the identified SAR</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Perforated pipes (exfiltration pipes) and soakaway pits may be more suited as supplementary water temperature control measures</li></ul>                                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>▪ Bioswales may decrease water temperature, providing benefits to the identified SAR</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Bioswales may be more suited as supplementary water temperature control measures</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"><li>▪ There are opportunities for cooling water before discharging downstream via inlet/outlet structures and other pond details</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Thermal mitigation can be provided by inlet/outlet configurations</li><li>▪ Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li></ul>                                                                                           |
| Summary / Recommendations                             | <ul style="list-style-type: none"><li>▪ Perforated pipes (exfiltration pipes) and soakaway pits present few impact on the natural environment</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"><li>▪ Bioswales which are properly designed to avoid phosphorus loading provide positive impact on the natural environment</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"><li>▪ Removal of sediment from downstream waters is beneficial to aquatic species</li><li>▪ Trees will most likely have to be removed</li></ul>                                                                                                                                                                                                                                                                                                                                                                                           |
| Social Impacts                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Requirement of easements or purchase of private lands | <ul style="list-style-type: none"><li>▪ To be constructed within municipal R.O.W.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Not applicable</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>▪ To be constructed within municipal R.O.W.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Not applicable</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"><li>▪ Acquisition of private lands not required for this site</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Land requirements would be confirmed through conceptual design</li></ul>                                                                                                                                                                                                                                                                                              |
| Impacts to public and private                         | <ul style="list-style-type: none"><li>▪ Impacts may include temporary, minor traffic and noise issues due to construction within</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"><li>▪ Impacts may include temporary, minor traffic and noise issues due to construction within the</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>▪ Noise and visual impacts associated with construction for the residences backing onto</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                     |

| Criteria                                      | Alternatives for Pond #5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                               | Infiltration in Right-of-Ways (R.O.W.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Bioswales                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Expand Size of Existing Pond                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| properties due to construction and operations | <p>the residential streets</p> <p><b>Mitigation/Compensation/Enhancement Measures</b></p> <ul style="list-style-type: none"> <li>▪ Appropriate construction and traffic management schedule to be adhered to</li> </ul>                                                                                                                                                                                                                                                                                                            | <p>residential streets</p> <ul style="list-style-type: none"> <li>▪ Bioswales are likely to face public opposition due to the maintenance requirements, visual disruption to an otherwise “clean” front lawn and inconvenience of culverts under driveways</li> </ul> <p><b>Mitigation/Compensation/Enhancement Measures</b></p> <ul style="list-style-type: none"> <li>▪ Appropriate construction and traffic management schedule to be adhered to</li> </ul>                                        | <p>wetland block</p> <ul style="list-style-type: none"> <li>▪ Pond block is adjacent to recreational park land and expansion could occur onto this land</li> </ul> <p><b>Mitigation/Compensation/Enhancement Measures</b></p> <ul style="list-style-type: none"> <li>▪ Construction management plan, including restrictions on hours</li> <li>▪ A staging area should be set up within the municipal parkland as to not interfere with traffic or private property</li> </ul> |
| Effect on public safety                       | <ul style="list-style-type: none"> <li>▪ No public safety concerns beyond construction period</li> </ul> <p><b>Mitigation/Compensation/Enhancement Measures</b></p> <ul style="list-style-type: none"> <li>▪ Proper signage and safety measures to be set up for construction period</li> </ul>                                                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>▪ No public safety concerns beyond construction period</li> </ul> <p><b>Mitigation/Compensation/Enhancement Measures</b></p> <ul style="list-style-type: none"> <li>▪ Proper signage and safety measures to be set up for construction period</li> </ul>                                                                                                                                                                                                       | <ul style="list-style-type: none"> <li>▪ Conversion to wet pond may appear as a safety hazard since deeper water found within recreational parkland</li> </ul> <p><b>Mitigation/Compensation/Enhancement Measures</b></p> <ul style="list-style-type: none"> <li>▪ Adequate slopes, warning signs, and fencing (if required) will provide measures of safety, all as per the required criteria</li> </ul>                                                                     |
| Summary / Recommendations                     | <ul style="list-style-type: none"> <li>▪ Impacts are minor and mostly temporary, within the construction period</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"> <li>▪ Impacts during construction are temporary and mostly minor</li> <li>▪ Long term impacts on residents due to visual impacts and culvert maintenance may be significant</li> </ul>                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>▪ Expansion of the wet pond would be a longer-term construction project with potential noise, traffic and visual impacts</li> <li>▪ Possible loss of recreational park space</li> <li>▪ Overall, impact not significant due to setback from residential homes and safety measures used throughout construction</li> </ul>                                                                                                              |
| Economic Considerations                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Capital costs                                 | <ul style="list-style-type: none"> <li>▪ Moderate to high capital cost related to new pipe infrastructure, earthworks and plantings, as well as likely relocation of existing pipe infrastructure</li> </ul> <p><b>Mitigation/Compensation/Enhancement Measures</b></p> <ul style="list-style-type: none"> <li>▪ Proficient SUE investigation prior to design work can minimize unexpected existing pipe/utility interferences</li> </ul>                                                                                          | <ul style="list-style-type: none"> <li>▪ Moderate to high capital cost related to new pipe infrastructure, earthworks and plantings, as well as likely relocation of existing pipe infrastructure</li> </ul> <p><b>Mitigation/Compensation/Enhancement Measures</b></p> <ul style="list-style-type: none"> <li>▪ Proficient SUE investigation prior to design work can minimize unexpected existing pipe/utility interferences</li> </ul>                                                             | <ul style="list-style-type: none"> <li>▪ Moderate to high capital cost for earthworks, grading, infrastructure components, permits</li> </ul> <p><b>Mitigation/Compensation/Enhancement Measures</b></p> <ul style="list-style-type: none"> <li>▪ Capital costs can be marginally reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required detention volumes)</li> </ul>                                                           |
| Maintenance and operating costs               | <ul style="list-style-type: none"> <li>▪ Moderate maintenance costs associated with unclogging perforated pipes</li> </ul> <p><b>Mitigation/Compensation/Enhancement Measures</b></p> <ul style="list-style-type: none"> <li>▪ Pre-treatment of stormwater with grassed filter strips can prevent some clogging of perforated pipes</li> </ul>                                                                                                                                                                                     | <ul style="list-style-type: none"> <li>▪ Low to moderate maintenance costs associated with replacing filter media, unclogging perforated pipes</li> </ul> <p><b>Mitigation/Compensation/Enhancement Measures</b></p> <ul style="list-style-type: none"> <li>▪ Pre-treatment of stormwater with grassed filter strips can prevent some clogging of perforated pipes</li> </ul>                                                                                                                         | <ul style="list-style-type: none"> <li>▪ Moderate maintenance cost and frequency; likely seasonally</li> </ul> <p><b>Mitigation/Compensation/Enhancement Measures</b></p> <ul style="list-style-type: none"> <li>▪ Maintenance frequency should be as directed by operations manual</li> </ul>                                                                                                                                                                                |
| Impact on future development and growth       | <ul style="list-style-type: none"> <li>▪ Retrofit R.O.W. with perforated pipes and soakaway pits may dictate R.O.W. standards for future development</li> </ul> <p><b>Mitigation/Compensation/Enhancement Measures</b></p> <ul style="list-style-type: none"> <li>▪ On-site control requirements for any future intensification within the watershed would mitigate negative impacts on the LID</li> </ul>                                                                                                                         | <ul style="list-style-type: none"> <li>▪ Retrofit R.O.W. with bioswales may dictate R.O.W. standards for future development</li> </ul> <p><b>Mitigation/Compensation/Enhancement Measures</b></p> <ul style="list-style-type: none"> <li>▪ Bioswales can enhance the aesthetic appeal of a neighbourhood / development and provide an ‘added value’</li> <li>▪ On-site control requirements for any future intensification within the watershed would mitigate negative impacts on the LID</li> </ul> | <ul style="list-style-type: none"> <li>▪ Design would limit land use to existing conditions; any proposed intensification within the watershed would likely require on-site controls</li> </ul> <p><b>Mitigation/Compensation/Enhancement Measures</b></p> <ul style="list-style-type: none"> <li>▪ On-site control requirements for any intensified development within the pond’s watershed</li> </ul>                                                                       |
| Summary / Recommendations                     | <ul style="list-style-type: none"> <li>▪ Perforated pipes and soakaway pits are a moderate to high capital cost for retrofit and require moderately complex maintenance</li> </ul>                                                                                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"> <li>▪ Bioswales are a moderate to high capital cost for retrofit but may add value to a neighbourhood, depending on general public opinion</li> </ul>                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"> <li>▪ Expansion of the wetland to a wet pond would present high capital costs for achievement of all the SWM criteria</li> </ul>                                                                                                                                                                                                                                                                                                           |
| Results of Alternative Evaluation             | <ul style="list-style-type: none"> <li>▪ This alternative is not preferred because infiltration in R.O.W.s cannot provide the required level of water quality and erosion control.</li> <li>▪ Another alternative would need to be implemented in conjunction with infiltration in R.O.W.s in order to meet SWM objectives, making this alternative economically inefficient.</li> <li>▪ The construction of infiltration pipes in R.O.W.s will create short term accessibility, visual and noise impacts on residents.</li> </ul> | <ul style="list-style-type: none"> <li>▪ This alternative is not preferred because bioswales cannot provide the required level of water quality and erosion control.</li> <li>▪ Another alternative would need to be implemented in conjunction with bioswales in order to meet SWM objectives, making this alternative economically inefficient.</li> <li>▪ The construction and maintenance of bioswales will create short and long term accessibility and visual impacts on residents.</li> </ul>  | <ul style="list-style-type: none"> <li>▪ Retaining existing trees and recreational park land is a high priority for the City of Markham; however the loss of trees and park space is probable for construction of this alternative. Therefore, this is not a preferred option.</li> </ul>                                                                                                                                                                                     |



| Table 1 –Evaluation of Conceptual Design Alternatives for Pond #24 (Offline Wetland) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Criteria                                                                             | Alternatives for Pond #24                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                                                                                      | Do Nothing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Oil-Grit Separators (OGS)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Convert to Wet Pond                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Alternative Description                                                              | <ul style="list-style-type: none"><li>The pond will continue to function as existing</li><li>Pond #24 is an offline wetland that was built as a dry pond with a 20.84 ha minor and major drainage area</li></ul>                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"><li>Total of 1 unit connected to the minor system prior to the outfall</li></ul>                                                                                                                                                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"><li>Earthworks</li><li>Outlet retrofit</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Location in Treatment Train                                                          | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | End of Pipe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Target SWM Objective(s)                                                              | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Quality Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Technical Considerations                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Constructability and accessibility                                                   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>Location is accessible as OGS unit could be installed upstream of the outfall at a manhole within municipal roadways; construction area is required is relatively small</li><li>Construction considerations include traffic interruptions and short term road closures</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Traffic management plans may reduce inconveniences associated with construction</li></ul> | <ul style="list-style-type: none"><li>Feasible but extensive construction; accessibility is moderate to difficult due to slopes</li><li>Requires large amount of earthworks to re-grade the block to suit wet pond design criteria</li><li>Area may not be sufficient to fit required wet pond volume and to conform to pond slope criteria; would likely require use of retaining walls if located within current facility block</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Traffic management plans, erosion and sediment control plans</li><li>Wet pond would be more feasible within a larger area; could realign watercourse to gain more usable land area</li></ul> |
| Ability to meet stormwater management objective(s)                                   | <ul style="list-style-type: none"><li>Does not provide for or meet the stormwater management objectives of the City and/or TRCA, for water quality, erosion or quantity control</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul>                                                                                                                                                                                               | <ul style="list-style-type: none"><li>OGS units may be able to provide all required stormwater quality objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Pre-treatment of stormwater runoff with LIDs will enhance the performance of the OGS</li></ul>                                                                                                                                                                                       | <ul style="list-style-type: none"><li>Wet pond could be constructed to meet all SWM quality criteria, but space may be an issue</li><li>Quantity control is required at this location (post to pre up to 100-year event using unit flow rates)</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Wet pond function is enhanced with LIDs as pre-treatment and inlet/outlets can be designed to provide thermal mitigation</li></ul>                                                                                                                                                                                                                                              |
| Engineering best practises / Innovative solution                                     | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>OGS and similar units are noted as best management practices</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Pre-treatment of stormwater runoff with LIDs will enhance the performance of the OGS</li></ul>                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>Traditional SWM approach</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Approach may be enhanced by implementing the use of LIDs in conjunction with a wet pond</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Summary / Recommendations                                                            | <ul style="list-style-type: none"><li>Does not provide for or meet the stormwater management objectives of the City and/or TRCA, for water quality, erosion or quantity control</li></ul>                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"><li>OGS can be effective, low-space option to provide water quality for the wetland</li></ul>                                                                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"><li>Conversion of the wetland to a wet pond can meet the required quality and quantity control stormwater objectives, but space issues may be a setback and constructability is moderate to difficult due to the slopes &amp; existing vegetation</li><li>Watercourse realignment could be an option to gain more land space for the wet pond; however, this is a costly and intensive process</li></ul>                                                                                                                                                                                                                                                                                         |
| Natural Environment                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Impacts to wildlife and vegetation habitats                                          | <ul style="list-style-type: none"><li>The current condition of wildlife and vegetation habitats will not change; however if the lack of quality and erosion control causes future erosion in the receiving watercourse or impacts the quality of the water in the watercourse, this could have a negative impact on the future condition of wildlife and vegetation habitats.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul> | <ul style="list-style-type: none"><li>OGS does not physically interfere with the wetland and improves water quality prior to discharge to the wetland</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation required</li></ul>                                                                                                                                                                                                                 | <ul style="list-style-type: none"><li>Construction of a wet pond will require earthworks within the existing wetland habitat, therefore interfering with existing wildlife and vegetation and may include the removal of adult trees</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Fisheries timing windows will be adhered to if required; an ecologist/biologist will be consulted due to proximity to existing watercourse</li></ul>                                                                                                                                                                                                                                      |
| Impacts / Improvements based on SAR / ESA                                            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>Meeting water quality criteria will improve water quality of downstream receiving waters</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Use of OGS can be enhanced with pre-treatment using LIDs throughout major and minor system watershed</li></ul>                                                                                                                                                          | <ul style="list-style-type: none"><li>There are opportunities for cooling water before discharging downstream via inlet/outlet structures and other pond details</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Thermal mitigation is not specifically required at this location</li><li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li></ul>                                                                                                                                                                                                                                                         |
| Summary / Recommendations                                                            | <ul style="list-style-type: none"><li>Existing wetland and terrestrial vegetation in the pond block provide habitat area and will remain in the current condition</li></ul>                                                                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"><li>OGS offers improvements to water quality</li><li>Used in conjunction with LIDs, OGS can improve water conditions for any sensitive habitats downstream</li></ul>                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"><li>Wet pond can be beneficial to downstream receiving waters but will alter any existing habitat</li><li>Adult trees may be lost during construction</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

| Criteria                                                                    | Alternatives for Pond #24                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                             | Do Nothing                                                                                                                                                                                                                            | Oil-Grit Separators (OGS)                                                                                                                                                                                                                                                                                                                                                                                                                            | Convert to Wet Pond                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                                                                             |                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Social Impacts                                                              |                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Requirement of easements or purchase of private lands                       | N/A                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Likely not required; preference to install and maintain OGS within municipal R.O.W., where maintenance is easily accessible</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not applicable</li> </ul>                                                                                                                                                   | <ul style="list-style-type: none"> <li>Acquisition of private lands would likely not be beneficial for the retrofit due to the nature of the site</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Land requirements would be confirmed through conceptual design</li> </ul>                                                                                                                       |
| Impacts to public and private properties due to construction and operations | N/A                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Roadway interference and/or short-term closure would be expected for the installation of OGS units</li> <li>Temporary interference to be expected on roadways during maintenance (approximately once a year)</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Traffic management plans may reduce inconveniences associated with construction</li> </ul> | <ul style="list-style-type: none"> <li>Noise and visual impacts associated with construction for the residences backing onto wetland block</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Construction management plan, including restrictions on hours</li> <li>A staging area should be set up within the R.O.W. as to not interfere with traffic or private property</li> </ul>               |
| Effect on public safety                                                     | N/A                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Installed OGS does not pose threats to public safety</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>No mitigation undertaken</li> </ul>                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>Potential use of retaining walls may present a safety concern; however, recreational trails are not present within this immediate area</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Adequate slopes, warning signs, and fencing (if required) will provide measures of safety</li> </ul>                                                                |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"> <li>The ‘Do Nothing’ alternative has no social impacts</li> </ul>                                                                                                                                  | <ul style="list-style-type: none"> <li>OGS presents few and short-term impacts associated with installation and maintenance</li> </ul>                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"> <li>Conversion of the wetland to a wet pond would be a longer-term construction project with potential noise, traffic and visual impacts</li> <li>Potential use of retaining walls will require additional safety measures</li> </ul>                                                                                                                                                                                |
| Economic Considerations                                                     |                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Capital costs                                                               | <ul style="list-style-type: none"> <li>No action may result in greater capital expenses in the future</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not applicable</li> </ul> | <ul style="list-style-type: none"> <li>Low capital cost for installation of one (1) unit and associated infrastructure works</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Capital cost of OGS units can be reduced if stormwater is pre-treated with LIDs (thus scaling down required OGS size)</li> </ul>                                                                                  | <ul style="list-style-type: none"> <li>High capital cost for earthworks, grading, infrastructure components, permits</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Capital costs can be marginally reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required detention volumes)</li> <li>Costs due to more complex access may be increased</li> </ul> |
| Maintenance and operating costs                                             | N/A                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Fairly low maintenance cost and frequency; approximately annually</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Maintenance frequency of OGS units should not decrease with increased pre-treatment</li> </ul>                                                                                                                                        | <ul style="list-style-type: none"> <li>Moderate maintenance cost and frequency; likely seasonally</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Maintenance frequency should be as directed by operations manual</li> </ul>                                                                                                                                                                     |
| Impact on future development and growth                                     | N/A                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Size of OGS is static once installed and would require upgrading if a larger drainage area is directed to it (in order to meet water quality criteria)</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Additional OGS units or upscaled units may be installed in the future to correspond with growth</li> </ul>                                       | <ul style="list-style-type: none"> <li>Design would limit land use to existing conditions; any proposed intensification within the watershed would likely require on-site controls</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>On-site control requirements for any intensified development within the pond’s watershed</li> </ul>                                                            |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"> <li>‘Do nothing’ may postpone required works and increase future costs</li> </ul>                                                                                                                  | <ul style="list-style-type: none"> <li>Installation of OGS units is a fairly low cost solution for achievement of most of the required SWM criteria</li> </ul>                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"> <li>Conversion of the wetland to a wet pond would present high capital costs for achievement of all the SWM criteria</li> </ul>                                                                                                                                                                                                                                                                                      |
| Results of Alternative Evaluation                                           | <ul style="list-style-type: none"> <li>This alternative is not preferred because the alternative does not meet the stormwater management objectives</li> </ul>                                                                        | <ul style="list-style-type: none"> <li>This is a preferred alternative due to the lower cost, small disturbance area and ability to provide full quality control</li> <li>This alternative can be implemented with little to no loss of existing trees.</li> </ul>                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>A wet pond facility would be capable of fully meeting the requirements for quality control</li> <li>Retaining existing trees is a high priority for the City of Markham; however tree loss is probable for construction of this alternative. Therefore, this is not a preferred option.</li> </ul>                                                                                                               |

| Criteria                                              | Alternatives for Pond #24                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |
|-------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
|                                                       | Construct Forebay                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Retrofit Outlet to Extend Detention                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |
| Alternative Description                               | <ul style="list-style-type: none"> <li>Earthworks for construction of berm and increased forebay depth</li> <li>Downstream section of facility will remain as existing and outlet will not be affected</li> </ul>                                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"> <li>Construct upgraded outlet structure to increase the extended detention within existing SWM facility</li> </ul>                                                                                                                                                                                                                                                                                                                                       |  |
| Location in Treatment Train                           | End of Pipe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |
| Target SWM Objective(s)                               | Quality Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Erosion Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |
| Technical Considerations                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |
| Constructability and accessibility                    | <ul style="list-style-type: none"> <li>Feasible and moderately extensive construction; accessibility is moderate to complex</li> <li>Requires moderate amount of earthworks to re-grade land to suit forebay design criteria</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Traffic management plans, erosion and sediment control plans</li> <li>Geometry of forebay can be optimized at conceptual design stage, including a low flow channel</li> </ul>                                                           | <ul style="list-style-type: none"> <li>Construction is within municipally owned lands</li> <li>Access will disturb local ecology by removing trees around the outlet and construction access route</li> <li>Associated works involving expanding the facility volume may present constructability issues</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Traffic management plans, erosion and sediment control plans</li> </ul>      |  |
| Ability to meet stormwater management objective(s)    | <ul style="list-style-type: none"> <li>Forebay could provide water quality control; additional measures required for thermal mitigation and erosion control</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Forebay function could be enhanced with implementation of LIDs throughout watershed</li> <li>Forebay water temperature can be cooled through planting techniques</li> </ul>                                                                                                                               | <ul style="list-style-type: none"> <li>Provided that adequate volume can be made available, the adjustment of the outlet can be an effective solution to provide the required extended detention</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Retrofit of the outlet would require upgrade of the available storage volume of the facility</li> <li>Erosion control may be facilitated with use of LIDs upstream</li> </ul>        |  |
| Engineering best practises / innovative solution      | <ul style="list-style-type: none"> <li>Typically more traditional SWM approach</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Forebay function can be enhanced with LIDs</li> </ul>                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"> <li>Typically more traditional SWM approach</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Erosion control may be facilitated with use of LIDs upstream</li> </ul>                                                                                                                                                                                                                                |  |
| Summary / Recommendations                             | <ul style="list-style-type: none"> <li>Construction of a forebay can meet SWM criteria within a lesser footprint than a full wet pond; requires additional erosion controls</li> <li>Quantity control would still be outstanding without additional retrofit</li> </ul>                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"> <li>Constructability may be complex due to topography and access of the site</li> <li>More supplementary alternatives required to provide adequate quantity and quality control</li> </ul>                                                                                                                                                                                                                                                               |  |
| Natural Environment                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |
| Impacts to wildlife and vegetation habitats           | <ul style="list-style-type: none"> <li>Construction of a forebay will require earthworks partially within the existing wetland habitat, therefore interfering with existing wildlife and vegetation</li> <li>The removal of some trees may be required</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Fisheries and migratory bird timing windows will be adhered to if required; an ecologist/biologist will be consulted</li> <li>Restoration plans will be developed to restore any cleared vegetation</li> </ul> | <ul style="list-style-type: none"> <li>Vegetation will be cleared for retrofit of the facility outlet, and access to the site</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Fisheries and migratory bird timing windows will be adhered to if required;</li> <li>The retrofit design may not be able to retain existing trees in the area</li> <li>Restoration plans will be developed to restore any cleared vegetation</li> </ul> |  |
| Impacts / improvements based on SAR / ESA             | <ul style="list-style-type: none"> <li>There are opportunities for cooling water before discharging downstream via inlet structures and planting techniques</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Thermal mitigation may be improved with the construction of a forebay</li> <li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li> </ul>                                                                                              | <ul style="list-style-type: none"> <li>Opportunities exist for cooling water before discharging downstream via outlet structures</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Can be enhanced with LID measures upstream</li> <li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li> </ul>                                                                    |  |
| Summary / Recommendations                             | <ul style="list-style-type: none"> <li>A forebay can be beneficial to downstream receiving waters but will alter any existing habitat within the construction area</li> <li>Loss of existing trees within the pond block</li> <li>Quantity control at the site is still required to meet criteria</li> </ul>                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>Retrofit of the existing outlet will have a low impact to the natural environment although will require tree removal</li> <li>If storage volume can be adequately increased, the retrofit of the outlet can provide required erosion control which will increase water quality</li> </ul>                                                                                                                                                            |  |
| Social Impacts                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |
| Requirement of easements or purchase of private lands | <ul style="list-style-type: none"> <li>Likely not required; block is relatively large and moderately accessible</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Land requirements would be confirmed</li> </ul>                                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"> <li>Likely not required; block is relatively large and moderately accessible</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Land requirements would be confirmed</li> </ul>                                                                                                                                                                                                                       |  |



|                                                                             | Alternatives for Pond #24                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |
|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Criteria                                                                    | Construct Forebay                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Retrofit Outlet to Extend Detention                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |
|                                                                             | through conceptual design                                                                                                                                                                                                                                                                                                                                                                                                                                             | through conceptual design                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |
| Impacts to public and private properties due to construction and operations | <ul style="list-style-type: none"> <li>Noise and visual impacts associated with construction for the residences backing onto wetland block at upstream end</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Construction management plan, including restrictions on hours</li> <li>A staging area should be set up within the public road R.O.W. as to not interfere with traffic or private property</li> </ul> | <ul style="list-style-type: none"> <li>Noise and visual impacts associated with construction for the residences backing onto wetland block at upstream end</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Construction management plan, including restrictions on hours</li> <li>A staging area should be set up within the public road R.O.W. and municipal parkland as to not interfere with traffic or private property</li> </ul> |  |
| Effect on public safety                                                     | <ul style="list-style-type: none"> <li>By building to the required slope and depth criteria, the forebay should not pose a threat to public safety</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Adequate slopes, warning signs, and fencing (if required) will provide measures of safety</li> </ul>                                                                                                         | <ul style="list-style-type: none"> <li>Retrofit of the outlet itself has low impact on public safety</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Warning signs and fencing (if required) will provide measures of safety</li> </ul>                                                                                                                                                                                                |  |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"> <li>Construction of a forebay would be a longer-term construction project with potential noise, traffic and visual impacts</li> <li>Scale of construction is lesser than conversion of wetland to a wet pond</li> </ul>                                                                                                                                                                                                            | <ul style="list-style-type: none"> <li>Retrofit of the facility outlet itself is of low impact in regards to noise, traffic and land use</li> <li>Scale of construction is relatively small</li> </ul>                                                                                                                                                                                                                                                                                       |  |
| Economic Considerations                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |
| Capital costs                                                               | <ul style="list-style-type: none"> <li>Moderate capital cost for earthworks, grading, infrastructure components, permits</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Capital costs can be marginally reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required volumes)</li> </ul>                                                                                | <ul style="list-style-type: none"> <li>Low to moderate cost for the retrofit of the outlet itself</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Capital costs can be marginally reduced if the extended detention volume does not increase significantly</li> </ul>                                                                                                                                                                  |  |
| Maintenance and operating costs                                             | <ul style="list-style-type: none"> <li>Moderate maintenance cost and frequency; likely seasonally</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Maintenance frequency should be as directed by operations manual</li> </ul>                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Low maintenance cost and frequency; likely seasonally to prevent clogging</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Maintenance frequency should be as directed by operations manual</li> </ul>                                                                                                                                                                                           |  |
| Impact on future development and growth                                     | <ul style="list-style-type: none"> <li>No impact, but forebay would require further expansion if contributing land use was to intensify</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>On-site control requirements for any intensified development within the forebay's watershed would mitigate further expansion</li> </ul>                                                                                 | <ul style="list-style-type: none"> <li>No impacts</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not applicable</li> </ul>                                                                                                                                                                                                                                                                                                            |  |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"> <li>Construction of a forebay would present moderate capital costs for achievement of quality control</li> </ul>                                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Retrofit of the existing outlet to provide the required extended detention is a relatively low cost solution in itself; the corresponding requirement to increase the detention volume will increase the capital cost</li> </ul>                                                                                                                                                                                                                      |  |
| Results of Alternative Evaluation                                           | <ul style="list-style-type: none"> <li>Retaining existing trees is a high priority for the City of Markham; however tree loss is probable for construction of this alternative. Therefore, this is not a preferred option.</li> </ul>                                                                                                                                                                                                                                 | <ul style="list-style-type: none"> <li>Retaining existing trees is a high priority for the City of Markham; however tree loss is probable for construction of this alternative. Therefore, this is not a preferred option.</li> </ul>                                                                                                                                                                                                                                                        |  |

| Criteria                                           | Alternatives for Pond #24                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                    | Expand Size of Existing Pond                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Bioswales                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Infiltration in Right-of-Ways (R.O.W.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Alternative Description                            | <ul style="list-style-type: none"><li>Expand the existing SWM facility area in terms of volume to provide for adequate permanent pool, active storage, and extended detention</li></ul>                                                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"><li>Construct bioswales within the road right-of-ways within the facility drainage area</li><li>Bioswales to contain native plantings and subdrains</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"><li>Install perforated secondary pipe within existing storm sewer systems to allow for infiltration through linear soakaway pits</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Location in Treatment Train                        | End of Pipe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Conveyance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Target SWM Objective(s)                            | Quantity, Quality, and Erosion Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Quality, Erosion and Temperature Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Technical Considerations                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Constructability and accessibility                 | <ul style="list-style-type: none"><li>Moderate to complex constructability due to the existing topography</li><li>Constructability will also be affected by the total footprint required for the pond</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Efficient design and potential use of retaining walls can increase the constructability of the expanded pond at this site</li></ul>                                                                                                        | <ul style="list-style-type: none"><li>Construction area is extensive and pipe networks are more intricate, requiring coordination with existing infrastructure</li><li>Road right of ways need to be conducive to grading and space criteria for bioswales</li><li>Based on soil mapping, the majority of the drainage area is not ideal for infiltration.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Bioswales may be more suited as supplementary water quality / erosion / temperature control measures, where constructability and retrofit are least disruptive to existing infrastructure</li><li>Site specific soil testing is required to confirm suitability of infiltration</li></ul> | <ul style="list-style-type: none"><li>Construction area is extensive and many secondary infiltration pipes would require to be installed to achieve SWM criteria</li><li>Requires coordination with existing infrastructure and utilities</li><li>Based on soil mapping, the majority of the drainage area is not ideal for infiltration.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may be more suited as supplementary water quality / erosion / temperature control measures, where constructability and retrofit are least disruptive to existing infrastructure</li><li>Site specific soil testing is required to confirm suitability of infiltration</li></ul> |
| Ability to meet stormwater management objective(s) | <ul style="list-style-type: none"><li>With sufficient space to construct, expansion of the facility will provide adequate controls to meet the SWM objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Pre-treatment of stormwater with LIDs can reduce the required expansion volume</li><li>Using the maximum safe slopes will decrease the footprint of the expanded pond</li></ul>                                                                                                    | <ul style="list-style-type: none"><li>Bioswales are more effective when used within a treatment train to achieve the stormwater objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Additional pre-treatment will enhance the function of bioswales, to reduce clogging of the underdrain pipes</li></ul>                                                                                                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may are more effective when used within a treatment train to achieve the stormwater objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Additional pre-treatment will enhance the function of the perforated pipes, to reduce clogging</li></ul>                                                                                                                                                                                                                                                                                                                                                                             |
| Engineering best practises / innovative solution   | <ul style="list-style-type: none"><li>Typically more traditional SWM approach</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Can be enhanced with use of LIDs within the contributing watershed</li></ul>                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"><li>Bioswales are innovative solutions within stormwater management conveyance systems</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Enhanced with further use of LIDs such as vegetated filter strips</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may are innovative solutions within stormwater management</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Enhanced with further use of LIDs such as vegetated filter strips</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Summary / Recommendations                          | <ul style="list-style-type: none"><li>Configuration of the existing site does not lend itself particularly well to large-scale retrofit; constructability is enhanced if the expansion is minimized to only the most required SWM objectives</li></ul>                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>Bioswales are effective as part of a treatment train and where retrofit does not greatly interfere with existing infrastructure</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may are effective as part of a treatment train and where retrofit does not greatly interfere with existing infrastructure</li><li>Due to the poor infiltration in the soil, Infiltration in the R.O.W. is not a preferred option.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Natural Environment                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Impacts to wildlife and vegetation habitats        | <ul style="list-style-type: none"><li>Expansion of the existing facility will require earthworks within the existing wetland habitat, therefore interfering with existing wildlife and vegetation and will include the removal of mature trees</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Fisheries timing windows will be adhered to if required; an ecologist/biologist will be consulted due to proximity to existing watercourse</li><li>Restoration plan should be developed</li></ul> | <ul style="list-style-type: none"><li>May require removal of some vegetation depending on specific location</li><li>May present phosphorus issues if not properly designed and/or maintained</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Planted bioswales will enhance neighbourhoods with additional vegetated areas</li></ul>                                                                                                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"><li>May require removal of some vegetation depending on specific location; likely few impacts to existing wildlife and vegetation habitats</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Areas disturbed during construction will be restored</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Impacts / improvements based on SAR / ESA          | <ul style="list-style-type: none"><li>There are opportunities for cooling water before discharging downstream via inlet/outlet structures and other pond details</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Thermal mitigation is not specifically required at this location</li><li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li></ul>                                                                           | <ul style="list-style-type: none"><li>Bioswales may decrease water temperature, providing benefits to the identified SAR</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Bioswales may be more suited as supplementary water temperature control measures</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) may decrease water temperature, providing benefits to the identified SAR</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may be more suited as supplementary water temperature control measures</li></ul>                                                                                                                                                                                                                                                                                                                                                                                     |
| Summary / Recommendations                          | <ul style="list-style-type: none"><li>Removal of sediment from downstream waters is beneficial to aquatic species</li><li>Loss of trees is probable</li></ul>                                                                                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"><li>Bioswales which are properly designed to avoid phosphorus loading provide positive impact on the natural environment</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits present few impact on the natural environment</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Social Impacts                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Requirement of easements or purchase of            | <ul style="list-style-type: none"><li>Acquisition of private lands would likely not be beneficial for the retrofit due to the nature of the site</li></ul>                                                                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>To be constructed within municipal R.O.W.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"><li>To be constructed within municipal R.O.W.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

| Criteria                                                                    | Alternatives for Pond #24                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                             | Expand Size of Existing Pond                                                                                                                                                                                                                                                                                                                                                                                                                            | Bioswales                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Infiltration in Right-of-Ways (R.O.W.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| private lands                                                               | <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Land requirements would be confirmed through conceptual design</li> </ul>                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>Not applicable</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Not applicable</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Impacts to public and private properties due to construction and operations | <ul style="list-style-type: none"> <li>Noise and visual impacts associated with construction for the residences backing onto wetland block</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Construction management plan, including restrictions on hours</li> <li>A staging area should be set up within the R.O.W. as to not interfere with traffic or private property</li> </ul>               | <ul style="list-style-type: none"> <li>Impacts may include temporary, minor traffic and noise issues due to construction within the residential streets</li> <li>Bioswales are likely to face public opposition due to the maintenance requirements, visual disruption to an otherwise “clean” front lawn and inconvenience of culverts under driveways</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Appropriate construction and traffic management schedule to be adhered to</li> </ul> | <ul style="list-style-type: none"> <li>Impacts may include temporary, minor traffic and noise issues due to construction within the residential streets</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Appropriate construction and traffic management schedule to be adhered to</li> </ul>                                                                                                                                                                           |
| Effect on public safety                                                     | <ul style="list-style-type: none"> <li>Potential use of retaining walls may present a safety concern; however, recreational trails are not present within this immediate area</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Adequate slopes, warning signs, and fencing (if required) will provide measures of safety</li> </ul>                                                                | <ul style="list-style-type: none"> <li>No public safety concerns beyond construction period</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Proper signage and safety measures to be set up for construction period</li> </ul>                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"> <li>No public safety concerns beyond construction period</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Proper signage and safety measures to be set up for construction period</li> </ul>                                                                                                                                                                                                                                         |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"> <li>Expansion of the wetland to a wet pond would be a longer-term construction project with potential noise, traffic and visual impacts</li> <li>Potential use of retaining walls will require additional safety measures</li> </ul>                                                                                                                                                                                 | <ul style="list-style-type: none"> <li>Impacts during construction are temporary and mostly minor</li> <li>Long term impacts on residents due to visual impacts and culvert maintenance may be significant</li> </ul>                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"> <li>Impacts are minor and mostly temporary, within the construction period</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                     |
| Economic Considerations                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Capital costs                                                               | <ul style="list-style-type: none"> <li>High capital cost for earthworks, grading, infrastructure components, permits</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Capital costs can be marginally reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required detention volumes)</li> <li>Costs due to more complex access may be increased</li> </ul> | <ul style="list-style-type: none"> <li>Moderate to high capital cost related to new pipe infrastructure, earthworks and plantings, as well as likely relocation of existing pipe infrastructure</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Proficient SUE investigation prior to design work can minimize unexpected existing pipe/utility interferences</li> </ul>                                                                                                                     | <ul style="list-style-type: none"> <li>Moderate to high capital cost related to new pipe infrastructure, earthworks and plantings, as well as likely relocation of existing pipe infrastructure</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Proficient SUE investigation prior to design work can minimize unexpected existing pipe/utility interferences</li> </ul>                                                                                               |
| Maintenance and operating costs                                             | <ul style="list-style-type: none"> <li>Moderate maintenance cost and frequency; likely seasonally</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Maintenance frequency should be as directed by operations manual</li> </ul>                                                                                                                                                                     | <ul style="list-style-type: none"> <li>Low to moderate maintenance costs associated with replacing filter media, unclogging perforated pipes</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Pre-treatment of stormwater with grassed filter strips can prevent some clogging of perforated pipes</li> </ul>                                                                                                                                                                                 | <ul style="list-style-type: none"> <li>Moderate maintenance costs associated with unclogging perforated pipes</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Pre-treatment of stormwater with grassed filter strips can prevent some clogging of perforated pipes</li> </ul>                                                                                                                                                                                          |
| Impact on future development and growth                                     | <ul style="list-style-type: none"> <li>Design would limit land use to existing conditions; any proposed intensification within the watershed would likely require on-site controls</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>On-site control requirements for any intensified development within the pond’s watershed</li> </ul>                                                            | <ul style="list-style-type: none"> <li>Retrofit R.O.W. with bioswales may dictate R.O.W. standards for future development</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Bioswales can enhance the aesthetic appeal of a neighbourhood / development and provide an ‘added value’</li> <li>On-site control requirements for any future intensification within the watershed would mitigate negative impacts on the LID</li> </ul>                                                           | <ul style="list-style-type: none"> <li>Retrofit R.O.W. with perforated pipes and soakaway pits may dictate R.O.W. standards for future development</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>On-site control requirements for any future intensification within the watershed would mitigate negative impacts on the LID</li> </ul>                                                                                                                              |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"> <li>Expansion of the wetland to a wet pond would present high capital costs for achievement of all the SWM criteria</li> </ul>                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"> <li>Bioswales are a moderate to high capital cost for retrofit but may add value to a neighbourhood, depending on general public opinion</li> </ul>                                                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>Perforated pipes and soakaway pits are a moderate to high capital cost for retrofit and require moderately complex maintenance</li> </ul>                                                                                                                                                                                                                                                                                                                                             |
| Results of Alternative Evaluation                                           | <ul style="list-style-type: none"> <li>Retaining existing trees is a high priority for the City of Markham; however tree loss is probable for construction of this alternative. Therefore, this is not a preferred option.</li> </ul>                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>This alternative is not preferred because bioswales cannot provide the required level of water quality and erosion control.</li> <li>Another alternative would need to be implemented in conjunction with bioswales in order to meet SWM objectives, making this alternative economically inefficient.</li> <li>The construction and maintenance of bioswales will create short and long term accessibility and visual impacts on residents.</li> </ul>                                                     | <ul style="list-style-type: none"> <li>This alternative is not preferred because infiltration in R.O.W.s cannot provide the required level of water quality and erosion control.</li> <li>Another alternative would need to be implemented in conjunction with infiltration in R.O.W.s in order to meet SWM objectives, making this alternative economically inefficient.</li> <li>The construction of infiltration pipes in R.O.W.s will create short term accessibility, visual and noise impacts on residents.</li> </ul> |



| Table 1 –Evaluation of Conceptual Design Alternatives for Pond #38 (Offline Wetland) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Criteria                                                                             | Alternatives for Pond #38                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                                                                                      | Do Nothing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Oil-Grit Separators (OGS)                                                                                                                                                                                                                                                                                                                                     | Convert to Wet Pond                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Alternative Description                                                              | <ul style="list-style-type: none"><li>The pond will continue to function as existing</li><li>Pond #38 is an offline wetland that was built as a dry pond with a 8.16 ha minor drainage area and a 5.85 ha major drainage area</li></ul>                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"><li>Total of 1 unit connected to the minor system prior to the outfall</li></ul>                                                                                                                                                                                                                                            | <ul style="list-style-type: none"><li>Earthworks</li><li>Outlet retrofit</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Location in Treatment Train                                                          | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | End of Pipe                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Target SWM Objective(s)                                                              | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Quality Control                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Technical Considerations                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Constructability and accessibility                                                   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>Location is accessible as OGS unit could be installed upstream of the outfall at a manhole within municipal roadways; construction area is required is relatively small</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Erosion and sediment control plan</li></ul> | <ul style="list-style-type: none"><li>Feasible but extensive construction; access to site can be reached from pedestrian walkway and city easements</li><li>Requires large amount of earthworks to re-grade the block to suit wet pond design criteria</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Traffic management plans, erosion and sediment control plans</li><li>Wet pond would be more feasible within a larger area; could realign watercourse to gain more usable land area</li></ul> |
| Ability to meet stormwater management objective(s)                                   | <ul style="list-style-type: none"><li>Does not provide for or meet the stormwater management objectives of the City and/or TRCA, for water quality, erosion or quantity control</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul>                                                                                                                                                                                               | <ul style="list-style-type: none"><li>OGS units may be able to provide all required stormwater quality objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Pre-treatment of stormwater runoff with LIDs will enhance the performance of the OGS</li></ul>                                          | <ul style="list-style-type: none"><li>Wet pond could be constructed to meet all SWM quality criteria, but space may be an issue</li><li>Quantity control is required at this location (post to pre up to 100-year event using unit flow rates)</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Wet pond function is enhanced with LIDs as pre-treatment and inlet/outlets can be designed to provide thermal mitigation</li></ul>                                                                   |
| Engineering best practises / Innovative solution                                     | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>OGS and similar units are noted as best management practices</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Pre-treatment of stormwater runoff with LIDs will enhance the performance of the OGS</li></ul>                                                         | <ul style="list-style-type: none"><li>Traditional SWM approach</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Approach may be enhanced by implementing the use of LIDs in conjunction with a wet pond</li></ul>                                                                                                                                                                                                                                                                                    |
| Summary / Recommendations                                                            | <ul style="list-style-type: none"><li>Does not provide for or meet the stormwater management objectives of the City and/or TRCA, for water quality, erosion or quantity control</li></ul>                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"><li>OGS can be effective, low-space option to provide water quality for the wetland</li></ul>                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>Conversion of the wetland to a wet pond can meet the required quality and quantity control stormwater objectives, but space issues may be a setback and constructability is moderate to difficult due to the slopes &amp; existing vegetation</li><li>Watercourse realignment could be an option to gain more land space for the wet pond; however, this is a costly and intensive process</li></ul>                                                                                                              |
| Natural Environment                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Impacts to wildlife and vegetation habitats                                          | <ul style="list-style-type: none"><li>The current condition of wildlife and vegetation habitats will not change; however if the lack of quality and erosion control causes future erosion in the receiving watercourse or impacts the quality of the water in the watercourse, this could have a negative impact on the future condition of wildlife and vegetation habitats.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul> | <ul style="list-style-type: none"><li>OGS does not physically interfere with the wetland and improves water quality prior to discharge to the wetland</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation required</li></ul>                                                                    | <ul style="list-style-type: none"><li>Construction of a wet pond will require earthworks within the existing wetland habitat, therefore interfering with existing wildlife and vegetation and may include the removal of adult trees</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Fisheries timing windows will be adhered to if required; an ecologist/biologist will be consulted due to proximity to existing watercourse</li></ul>                                                           |
| Impacts / Improvements based on SAR / ESA                                            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>Meeting water quality criteria will improve water quality of downstream receiving waters</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Use of OGS can be enhanced with pre-treatment using LIDs throughout major and minor system watershed</li></ul>             | <ul style="list-style-type: none"><li>There are opportunities for cooling water before discharging downstream via inlet/outlet structures and other pond details</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Thermal mitigation is not specifically required at this location</li><li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li></ul>                                                                              |
| Summary / Recommendations                                                            | <ul style="list-style-type: none"><li>Existing wetland and terrestrial vegetation in the pond block provide habitat area and will remain in the current condition</li></ul>                                                                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"><li>OGS offers improvements to water quality</li><li>Used in conjunction with LIDs, OGS can improve water conditions for any sensitive habitats downstream</li></ul>                                                                                                                                                        | <ul style="list-style-type: none"><li>Wet pond can be beneficial to downstream receiving waters but will alter any existing habitat</li><li>Adult trees may be lost during construction</li></ul>                                                                                                                                                                                                                                                                                                                                                       |
| Social Impacts                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Requirement of                                                                       | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>Likely not required; preference to install and</li></ul>                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>Acquisition of private lands would likely not</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

| Criteria                                                                    | Alternatives for Pond #38                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                             | Do Nothing                                                                                                                                                                                                                            | Oil-Grit Separators (OGS)                                                                                                                                                                                                                                                                                                                                                                                                                            | Convert to Wet Pond                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| easements or purchase of private lands                                      |                                                                                                                                                                                                                                       | maintain OGS within municipal R.O.W., where maintenance is easily accessible<br><br><b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not applicable</li> </ul>                                                                                                                                                                                                                                             | be beneficial for the retrofit due to the nature of the site<br><br><b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Land requirements would be confirmed through conceptual design</li> </ul>                                                                                                                                                                                                                                |
| Impacts to public and private properties due to construction and operations | N/A                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Roadway interference and/or short-term closure would be expected for the installation of OGS units</li> <li>Temporary interference to be expected on roadways during maintenance (approximately once a year)</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Traffic management plans may reduce inconveniences associated with construction</li> </ul> | <ul style="list-style-type: none"> <li>Noise and visual impacts associated with construction for the residences backing onto wetland block</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Construction management plan, including restrictions on hours</li> <li>A staging area should be set up within the R.O.W. as to not interfere with traffic or private property</li> </ul>                               |
| Effect on public safety                                                     | N/A                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Installed OGS does not pose threats to public safety</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>No mitigation undertaken</li> </ul>                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>Potential use of retaining walls may present a safety concern; however, fencing could be installed</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Adequate slopes, warning signs, and fencing (if required) will provide measures of safety</li> </ul>                                                                                                                    |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"> <li>The ‘Do Nothing’ alternative has no social impacts</li> </ul>                                                                                                                                  | <ul style="list-style-type: none"> <li>OGS presents few and short-term impacts associated with installation and maintenance</li> </ul>                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"> <li>Conversion of the wetland to a wet pond would be a longer-term construction project with potential noise, traffic and visual impacts</li> <li>Potential use of retaining walls will require additional safety measures</li> </ul>                                                                                                                                                                                                |
| Economic Considerations                                                     |                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Capital costs                                                               | <ul style="list-style-type: none"> <li>No action may result in greater capital expenses in the future</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not applicable</li> </ul> | <ul style="list-style-type: none"> <li>Low capital cost for installation of one (1) unit and associated infrastructure works</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Capital cost of OGS units can be reduced if stormwater is pre-treated with LIDs (thus scaling down required OGS size)</li> </ul>                                                                                  | <ul style="list-style-type: none"> <li>High capital cost for earthworks, grading, infrastructure components, permits</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Capital costs can be marginally reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required detention volumes)</li> <li>Cost may increase due to potentially replacing walkway for access</li> </ul> |
| Maintenance and operating costs                                             | N/A                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Fairly low maintenance cost and frequency; approximately annually</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Maintenance frequency of OGS units should not decrease with increased pre-treatment</li> </ul>                                                                                                                                        | <ul style="list-style-type: none"> <li>Moderate maintenance cost and frequency; likely seasonally</li> <li>Moderate ease for site access through pedestrian walkway</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Maintenance frequency should be as directed by operations manual</li> </ul>                                                                                                                   |
| Impact on future development and growth                                     | N/A                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Size of OGS is static once installed and would require upgrading if a larger drainage area is directed to it (in order to meet water quality criteria)</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Additional OGS units or upscaled units may be installed in the future to correspond with growth</li> </ul>                                       | <ul style="list-style-type: none"> <li>Design would limit land use to existing conditions; any proposed intensification within the watershed would likely require on-site controls</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>On-site control requirements for any intensified development within the pond’s watershed</li> </ul>                                                                            |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"> <li>‘Do nothing’ may postpone required works and increase future costs</li> </ul>                                                                                                                  | <ul style="list-style-type: none"> <li>Installation of OGS units is a low to moderate cost solution for achievement of the required quality control</li> </ul>                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"> <li>Conversion of the wetland to a wet pond would present high capital costs for achievement of all the SWM criteria</li> </ul>                                                                                                                                                                                                                                                                                                      |
| Results of Alternative Evaluation                                           | <ul style="list-style-type: none"> <li>This alternative is not preferred because the alternative does not meet the stormwater management objectives</li> </ul>                                                                        | <ul style="list-style-type: none"> <li>This is a preferred alternative due to the lower cost, small disturbance area and ability to provide full quality control</li> <li>This alternative can be implemented with little to no loss of existing trees.</li> </ul>                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>A wet pond facility would be capable of fully meeting the requirements for quality control</li> <li>Retaining existing trees is a high priority for the City of Markham; however tree loss is probable for construction of this alternative. Therefore, this is not a preferred option.</li> </ul>                                                                                                                               |

| Criteria                                           | Alternatives for Pond #38                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                    | Construct Forebay                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Retrofit Outlet to Extend Detention                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Underground Storage Tanks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Alternative Description                            | <ul style="list-style-type: none"> <li>Earthworks for construction of berm and increased forebay depth</li> <li>Downstream section of facility will remain as existing and outlet will not be affected</li> </ul>                                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"> <li>Construct upgraded outlet structure to increase the extended detention within existing SWM facility</li> </ul>                                                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Installed in municipal owned lands including parks and the watercourse land parcel</li> <li>Underground storage tanks will capture and detain stormwater and release over an extended time period</li> <li>Infiltration type underground tanks will allow for infiltration during detention period</li> <li>May need water quality control prior to infiltrating (if infiltration is proposed)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                           |
| Location in Treatment Train                        | End of Pipe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Target SWM Objective(s)                            | Quality Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Erosion Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Erosion Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Technical Considerations                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Constructability and accessibility                 | <ul style="list-style-type: none"> <li>Feasible but extensive construction; access to site from pedestrian walkway and city easements</li> <li>Requires moderate amount of earthworks to re-grade land to suit forebay design criteria</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Traffic management plans, erosion and sediment control plans</li> <li>Geometry of forebay can be optimized at conceptual design stage, including a low flow channel</li> </ul>                                                 | <ul style="list-style-type: none"> <li>Feasible but extensive construction; access to site can be reached from pedestrian walkway and city easements</li> <li>Associated works involving expanding the facility volume may present constructability issues</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Traffic management plans, erosion and sediment control plans</li> </ul>                                                | <ul style="list-style-type: none"> <li>Footprint may be large and depends on available soil conditions; constructability is low due to minimal elevation difference between storm sewers and the watercourse</li> <li>Still allows for use of land at-grade, so can be proposed under existing recreational fields</li> <li>Requires re-organization of existing outfalls to feed into central underground tank(s)</li> <li>Based on soil mapping, the soil in the drainage area is conducive to infiltration</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Tanks with infiltration capabilities provide additional benefits for erosion and temperature control</li> <li>Site specific soil testing is required to confirm suitability of infiltration</li> </ul> |
| Ability to meet stormwater management objective(s) | <ul style="list-style-type: none"> <li>Forebay could provide water quality control; additional measures required for thermal mitigation and erosion control</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Forebay function could be enhanced with implementation of LIDs throughout watershed</li> <li>Forebay water temperature can be cooled through planting techniques</li> </ul>                                                                                                                               | <ul style="list-style-type: none"> <li>Given the existing wetland block and surrounding area, there may not be enough storage capacity to meet the full requirement for erosion control</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Retrofit of the outlet would require upgrade of the available storage volume of the facility</li> <li>Erosion control may be facilitated with use of LIDs upstream</li> </ul>             | <ul style="list-style-type: none"> <li>Underground tanks, especially with infiltration capabilities, are effective for providing erosion and temperature control</li> <li>Due to the existing storm sewer elevations and creek elevation, this option would not be a feasible option for erosion control</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Longer detention times and depth below grade can enhance the erosion and temperature control, respectively</li> </ul>                                                                                                                                                                                                                                                                                       |
| Engineering best practises / innovative solution   | <ul style="list-style-type: none"> <li>Typically more traditional SWM approach</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Forebay function can be enhanced with LIDs</li> </ul>                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"> <li>Typically more traditional SWM approach</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Erosion control may be facilitated with use of LIDs upstream</li> </ul>                                                                                                                                                                                                                            | <ul style="list-style-type: none"> <li>Underground tanks, including infiltration, are noted as best management practices</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Maintenance of underground tanks is more extensive than at-grade alternatives</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Summary / Recommendations                          | <ul style="list-style-type: none"> <li>Construction of a forebay can meet SWM criteria within a lesser footprint than a full wet pond; requires additional erosion controls</li> <li>Quantity control would still be outstanding without additional retrofit</li> </ul>                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"> <li>Constructability may be complex due to surrounding forest and valley lands</li> <li>Erosion control can be improved but full erosion control may not be feasible at this site.</li> </ul>                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>Constructability is low due to the existing elevation differences</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Natural Environment                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Impacts to wildlife and vegetation habitats        | <ul style="list-style-type: none"> <li>Construction of a forebay will require earthworks partially within the existing wetland habitat, therefore interfering with existing wildlife and vegetation</li> <li>The removal of some trees may be required</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Fisheries and migratory bird timing windows will be adhered to if required; an ecologist/biologist will be consulted</li> <li>Restoration plans will be developed to restore any cleared vegetation</li> </ul> | <ul style="list-style-type: none"> <li>Some vegetation will likely be cleared for retrofit of the facility outlet; low impact</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Fisheries and migratory bird timing windows will be adhered to if required;</li> <li>The retrofit design may be able to retain existing trees in the area</li> <li>Restoration plans will be developed to restore any cleared vegetation</li> </ul> | <ul style="list-style-type: none"> <li>Would require removal of vegetation depending on specific location</li> <li>Once installed, less intrusive than other alternatives because of location below grade</li> <li>May reduce terrestrial habitat</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Restoration plan required if loss of vegetation expected due to construction</li> <li>Migratory bird windows to be adhered to for construction</li> </ul>                                                                                                                                                                                                                                                                                                          |
| Impacts / improvements based on SAR / ESA          | <ul style="list-style-type: none"> <li>There are opportunities for cooling water before discharging downstream via inlet structures and planting techniques</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Thermal mitigation may be improved with the construction of a forebay</li> <li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li> </ul>                                                                                              | <ul style="list-style-type: none"> <li>Opportunities exist for cooling water before discharging downstream via outlet structures</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Can be enhanced with LID measures upstream</li> <li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li> </ul>                                                                | <ul style="list-style-type: none"> <li>Underground tanks may decrease water temperature, providing benefits to the identified SAR</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Summary / Recommendations                          | <ul style="list-style-type: none"> <li>A forebay can be beneficial to downstream receiving waters but will alter any existing habitat within the construction area</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"> <li>Retrofit of the existing outlet will have a low impact to the natural environment</li> <li>If storage volume can be adequately increased,</li> </ul>                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>Underground tanks are a long-term non-invasive alternative for providing erosion and temperature control</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |



|                                                                             | Alternatives for Pond #38                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Criteria                                                                    | Construct Forebay                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Retrofit Outlet to Extend Detention                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Underground Storage Tanks                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                                                                             | <ul style="list-style-type: none"> <li>Loss of existing trees within the pond block</li> <li>Quantity control at the site is still required to meet criteria</li> </ul>                                                                                                                                                                                                                                                                                               | the retrofit of the outlet can provide required erosion control which will increase water quality                                                                                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"> <li>This alternative may be a viable solution to provide erosion and quantity control without disruption to the existing wetland</li> </ul>                                                                                                                                                                                                                                                                                            |
| Social Impacts                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Requirement of easements or purchase of private lands                       | <ul style="list-style-type: none"> <li>Likely not required; block is relatively large and moderately accessible</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Land requirements would be confirmed through conceptual design</li> </ul>                                                                                                                                                                       | <ul style="list-style-type: none"> <li>Likely not required; block is relatively large and moderately accessible</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Land requirements would be confirmed through conceptual design</li> </ul>                                                                                                                                                                                              | <ul style="list-style-type: none"> <li>This alternative would require the acquisition of additional land or an easement</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Land requirements would be confirmed through conceptual design</li> </ul>                                                                                                                                                                   |
| Impacts to public and private properties due to construction and operations | <ul style="list-style-type: none"> <li>Noise and visual impacts associated with construction for the residences backing onto wetland block at upstream end</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Construction management plan, including restrictions on hours</li> <li>A staging area should be set up within the public road R.O.W. as to not interfere with traffic or private property</li> </ul> | <ul style="list-style-type: none"> <li>Noise and visual impacts associated with construction for the residences backing onto wetland block at upstream end</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Construction management plan, including restrictions on hours</li> <li>A staging area should be set up within the public road R.O.W. and municipal parkland as to not interfere with traffic or private property</li> </ul> | <ul style="list-style-type: none"> <li>Construction anticipated within wetland and/or park lands; impacts may include temporary, minor traffic and noise issues due to proximity to residential neighbourhood</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Proper signage and safety measures to be set up for construction period</li> <li>Park land may be restored after construction is completed</li> </ul> |
| Effect on public safety                                                     | <ul style="list-style-type: none"> <li>By building to the required slope and depth criteria, the forebay should not pose a threat to public safety</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Adequate slopes, warning signs, and fencing (if required) will provide measures of safety</li> </ul>                                                                                                         | <ul style="list-style-type: none"> <li>Retrofit of the outlet itself has low impact on public safety</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Warning signs and fencing (if required) will provide measures of safety</li> </ul>                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>No public safety concerns beyond construction period</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Proper signage and safety measures to be set up for construction period</li> </ul>                                                                                                                                                                                      |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"> <li>Construction of a forebay would be a longer-term construction project with potential noise, traffic and visual impacts</li> <li>Scale of construction is lesser than conversion of wetland to a wet pond</li> </ul>                                                                                                                                                                                                            | <ul style="list-style-type: none"> <li>Retrofit of the facility outlet itself is of low impact in regards to noise, traffic and land use</li> <li>Scale of construction is relatively small</li> </ul>                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"> <li>Underground tanks are proposed to be located in public lands, generally not intrusive to the public during or after construction</li> </ul>                                                                                                                                                                                                                                                                                        |
| Economic Considerations                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Capital costs                                                               | <ul style="list-style-type: none"> <li>Moderate capital cost for earthworks, grading, infrastructure components, permits</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Capital costs can be marginally reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required volumes)</li> </ul>                                                                                | <ul style="list-style-type: none"> <li>Low to moderate cost for the retrofit of the outlet itself</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Capital costs can be marginally reduced if the extended detention volume does not increase significantly</li> </ul>                                                                                                                                                                  | <ul style="list-style-type: none"> <li>Moderate to high capital cost related to storage tank infrastructure</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Efficient tank design to minimize capital costs</li> <li>Adequate soils and extend of earthworks will affect capital cost</li> </ul>                                                                                                                    |
| Maintenance and operating costs                                             | <ul style="list-style-type: none"> <li>Moderate maintenance cost and frequency; likely seasonally</li> <li>Moderate ease for site access through pedestrian walkway and city easements</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Maintenance frequency should be as directed by operations manual</li> </ul>                                                                                              | <ul style="list-style-type: none"> <li>Low maintenance cost and frequency; likely seasonally to prevent clogging</li> <li>Moderate ease for site access through pedestrian walkway and city easements</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Maintenance frequency should be as directed by operations manual</li> </ul>                                                                                                      | <ul style="list-style-type: none"> <li>Low maintenance costs associated with cleaning out tanks as per operations manual or in event of clogging</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Can prevent clogging with additional pre-treatment techniques</li> </ul>                                                                                                                                           |
| Impact on future development and growth                                     | <ul style="list-style-type: none"> <li>No impact, but forebay would require further expansion if contributing land use was to intensify</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>On-site control requirements for any intensified development within the forebay's watershed would mitigate further expansion</li> </ul>                                                                                 | <ul style="list-style-type: none"> <li>No impacts</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not applicable</li> </ul>                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"> <li>No impact, but underground tanks would require expansion if contributing land use was to intensify</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>On-site control requirements for any future intensification within the watershed would mitigate further expansion</li> </ul>                                                                                              |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"> <li>Construction of a forebay would present moderate capital costs for achievement of quality control</li> </ul>                                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Retrofit of the existing outlet to provide the required extended detention is a relatively low cost solution in itself; the corresponding requirement to increase the detention volume will increase the capital cost</li> </ul>                                                                                                                                                                                                                      | <ul style="list-style-type: none"> <li>Underground tanks can provide reasonable capital and maintenance costs for the achievement of erosion, quantity and temperature control</li> <li>Capital costs can fluctuate based on actual conditions at the specific location chosen at conceptual design</li> </ul>                                                                                                                                                            |
| Results of Alternative Evaluation                                           | <ul style="list-style-type: none"> <li>Retaining existing trees is a high priority for the City of Markham; however tree loss is probable for construction of this alternative. Therefore, this is not a preferred option.</li> </ul>                                                                                                                                                                                                                                 | <ul style="list-style-type: none"> <li>This alternative is preferred to provide cost-effective erosion control and can be used in conjunction with the other preferred alternatives.</li> </ul>                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"> <li>This is a not a preferred alternative due to low constructability and inability to meet the SWM objectives</li> </ul>                                                                                                                                                                                                                                                                                                              |

| Criteria                                           | Alternatives for Pond #38                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                    | Expand Size of Existing Pond                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Bioswales                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Infiltration in Right-of-Ways (R.O.W.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Alternative Description                            | <ul style="list-style-type: none"><li>Expand the existing SWM facility area in terms of volume to provide for adequate permanent pool, active storage, and extended detention</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>Construct bioswales within the road right-of-ways within the facility drainage area</li><li>Bioswales to contain native plantings and subdrains</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"><li>Install perforated secondary pipe within existing storm sewer systems to allow for infiltration through linear soakaway pits</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Location in Treatment Train                        | End of Pipe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Conveyance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Target SWM Objective(s)                            | Quality and Erosion Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Quality and Erosion Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Technical Considerations                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Constructability and accessibility                 | <ul style="list-style-type: none"><li>Moderate to complex constructability due to the existing vegetation and limited area</li><li>Constructability will also be affected by the total footprint required for the pond</li><li>Access can be reached through pedestrian walkway and city easements</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Efficient design and potential use of retaining walls can increase the constructability of the expanded pond at this site</li></ul>                                                                                   | <ul style="list-style-type: none"><li>Construction area is extensive and pipe networks are more intricate, requiring coordination with existing infrastructure</li><li>Road right of ways need to be conducive to grading and space criteria for bioswales</li><li>Based on soil mapping, the majority of the drainage area is not ideal for infiltration.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Bioswales may be more suited as supplementary water quality / erosion / temperature control measures, where constructability and retrofit are least disruptive to existing infrastructure</li><li>Site specific soil testing is required to confirm suitability of infiltration</li></ul> | <ul style="list-style-type: none"><li>Construction area is extensive and many secondary infiltration pipes would require to be installed to achieve SWM criteria</li><li>Requires coordination with existing infrastructure and utilities</li><li>Based on soil mapping, the majority of the drainage area is not ideal for infiltration.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may be more suited as supplementary water quality / erosion / temperature control measures, where constructability and retrofit are least disruptive to existing infrastructure</li><li>Site specific soil testing is required to confirm suitability of infiltration</li></ul> |
| Ability to meet stormwater management objective(s) | <ul style="list-style-type: none"><li>With sufficient space to construct, expansion of the facility will provide adequate controls to meet the SWM objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Pre-treatment of stormwater with LIDs can reduce the required expansion volume</li><li>Using the maximum safe slopes will decrease the footprint of the expanded pond</li></ul>                                                                                                                                                                            | <ul style="list-style-type: none"><li>Bioswales are more effective when used within a treatment train to achieve the stormwater objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Additional pre-treatment will enhance the function of bioswales, to reduce clogging of the underdrain pipes</li></ul>                                                                                                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may are more effective when used within a treatment train to achieve the stormwater objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Additional pre-treatment will enhance the function of the perforated pipes, to reduce clogging</li></ul>                                                                                                                                                                                                                                                                                                                                                                             |
| Engineering best practises / innovative solution   | <ul style="list-style-type: none"><li>Typically more traditional SWM approach</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Can be enhanced with use of LIDs within the contributing watershed</li></ul>                                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>Bioswales are innovative solutions within stormwater management conveyance systems</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Enhanced with further use of LIDs such as vegetated filter strips</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may are innovative solutions within stormwater management</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Enhanced with further use of LIDs such as vegetated filter strips</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Summary / Recommendations                          | <ul style="list-style-type: none"><li>Configuration of the existing site does not lend itself particularly well to large-scale retrofit; constructability is enhanced if the expansion is minimized to only the most required SWM objectives</li></ul>                                                                                                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"><li>Bioswales are effective as part of a treatment train and where retrofit does not greatly interfere with existing infrastructure</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may are effective as part of a treatment train and where retrofit does not greatly interfere with existing infrastructure</li><li>Due to the poor infiltration in the soil, Infiltration in the R.O.W. is not a preferred option.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Natural Environment                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Impacts to wildlife and vegetation habitats        | <ul style="list-style-type: none"><li>Expansion of the existing facility will require earthworks within the existing wetland habitat, therefore interfering with existing wildlife and vegetation and may include the removal of adult trees</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Fisheries timing windows will be adhered to if required; an ecologist/biologist will be consulted due to proximity to existing watercourse</li><li>Restoration plan should be developed</li><li>Conceptual design should be done to minimize the removal of trees</li></ul> | <ul style="list-style-type: none"><li>May require removal of some vegetation depending on specific location</li><li>May present phosphorus issues if not properly designed and/or maintained</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Planted bioswales will enhance neighbourhoods with additional vegetated areas</li></ul>                                                                                                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"><li>May require removal of some vegetation depending on specific location; likely few impacts to existing wildlife and vegetation habitats</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Areas disturbed during construction will be restored</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Impacts / improvements based on SAR / ESA          | <ul style="list-style-type: none"><li>There are opportunities for cooling water before discharging downstream via inlet/outlet structures and other pond details</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Thermal mitigation is not specifically required at this location</li><li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li></ul>                                                                                                                                                   | <ul style="list-style-type: none"><li>Bioswales may decrease water temperature, providing benefits to the identified SAR</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Bioswales may be more suited as supplementary water temperature control measures</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) may decrease water temperature, providing benefits to the identified SAR</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may be more suited as supplementary water temperature control measures</li></ul>                                                                                                                                                                                                                                                                                                                                                                                     |
| Summary / Recommendations                          | <ul style="list-style-type: none"><li>Removal of sediment from downstream waters is beneficial to aquatic species</li><li>Conceptual design should minimize the removal of trees</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"><li>Bioswales which are properly designed to avoid phosphorus loading provide positive impact on the natural environment</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits present few impact on the natural environment</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Social Impacts                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

| Criteria                                                                    | Alternatives for Pond #38                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                             | Expand Size of Existing Pond                                                                                                                                                                                                                                                                                                                                                                                                                                             | Bioswales                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Infiltration in Right-of-Ways (R.O.W.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Requirement of easements or purchase of private lands                       | <ul style="list-style-type: none"> <li>Acquisition of private lands would likely not be beneficial for the retrofit due to the nature of the site</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Land requirements would be confirmed through conceptual design</li> </ul>                                                                                                                                        | <ul style="list-style-type: none"> <li>To be constructed within municipal R.O.W.</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not applicable</li> </ul>                                                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>To be constructed within municipal R.O.W.</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not applicable</li> </ul>                                                                                                                                                                                                                                                                                                             |
| Impacts to public and private properties due to construction and operations | <ul style="list-style-type: none"> <li>Noise and visual impacts associated with construction for the residences backing onto wetland block</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Construction management plan, including restrictions on hours</li> <li>A staging area should be set up within the R.O.W. as to not interfere with traffic or private property</li> </ul>                                | <ul style="list-style-type: none"> <li>Impacts may include temporary, minor traffic and noise issues due to construction within the residential streets</li> <li>Bioswales are likely to face public opposition due to the maintenance requirements, visual disruption to an otherwise “clean” front lawn and inconvenience of culverts under driveways</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Appropriate construction and traffic management schedule to be adhered to</li> </ul> | <ul style="list-style-type: none"> <li>Impacts may include temporary, minor traffic and noise issues due to construction within the residential streets</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Appropriate construction and traffic management schedule to be adhered to</li> </ul>                                                                                                                                                                           |
| Effect on public safety                                                     | <ul style="list-style-type: none"> <li>Potential use of retaining walls may present a safety concern; however, fencing could be installed</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Adequate slopes, warning signs, and fencing (if required) will provide measures of safety</li> </ul>                                                                                                                     | <ul style="list-style-type: none"> <li>No public safety concerns beyond construction period</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Proper signage and safety measures to be set up for construction period</li> </ul>                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"> <li>No public safety concerns beyond construction period</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Proper signage and safety measures to be set up for construction period</li> </ul>                                                                                                                                                                                                                                         |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"> <li>Expansion of the wetland to a wet pond would be a longer-term construction project with potential noise, traffic and visual impacts</li> <li>Potential use of retaining walls will require additional safety measures</li> </ul>                                                                                                                                                                                                  | <ul style="list-style-type: none"> <li>Impacts during construction are temporary and mostly minor</li> <li>Long term impacts on residents due to visual impacts and culvert maintenance may be significant</li> </ul>                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"> <li>Impacts are minor and mostly temporary, within the construction period</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                     |
| Economic Considerations                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Capital costs                                                               | <ul style="list-style-type: none"> <li>High capital cost for earthworks, grading, infrastructure components, permits</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Capital costs can be marginally reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required detention volumes)</li> <li>Pedestrian walkway allows site access, although may be replacement</li> </ul> | <ul style="list-style-type: none"> <li>Moderate to high capital cost related to new pipe infrastructure, earthworks and plantings, as well as likely relocation of existing pipe infrastructure</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Proficient SUE investigation prior to design work can minimize unexpected existing pipe/utility interferences</li> </ul>                                                                                                                     | <ul style="list-style-type: none"> <li>Moderate to high capital cost related to new pipe infrastructure, earthworks and plantings, as well as likely relocation of existing pipe infrastructure</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Proficient SUE investigation prior to design work can minimize unexpected existing pipe/utility interferences</li> </ul>                                                                                               |
| Maintenance and operating costs                                             | <ul style="list-style-type: none"> <li>Moderate maintenance cost and frequency; likely seasonally</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Maintenance frequency should be as directed by operations manual</li> </ul>                                                                                                                                                                                      | <ul style="list-style-type: none"> <li>Low to moderate maintenance costs associated with replacing filter media, unclogging perforated pipes</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Pre-treatment of stormwater with grassed filter strips can prevent some clogging of perforated pipes</li> </ul>                                                                                                                                                                                 | <ul style="list-style-type: none"> <li>Moderate maintenance costs associated with unclogging perforated pipes</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Pre-treatment of stormwater with grassed filter strips can prevent some clogging of perforated pipes</li> </ul>                                                                                                                                                                                          |
| Impact on future development and growth                                     | <ul style="list-style-type: none"> <li>Design would limit land use to existing conditions; any proposed intensification within the watershed would likely require on-site controls</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>On-site control requirements for any intensified development within the pond’s watershed</li> </ul>                                                                             | <ul style="list-style-type: none"> <li>Retrofit R.O.W. with bioswales may dictate R.O.W. standards for future development</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Bioswales can enhance the aesthetic appeal of a neighbourhood / development and provide an ‘added value’</li> <li>On-site control requirements for any future intensification within the watershed would mitigate negative impacts on the LID</li> </ul>                                                           | <ul style="list-style-type: none"> <li>Retrofit R.O.W. with perforated pipes and soakaway pits may dictate R.O.W. standards for future development</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>On-site control requirements for any future intensification within the watershed would mitigate negative impacts on the LID</li> </ul>                                                                                                                              |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"> <li>Expansion of the wetland to a wet pond would present high capital costs for achievement of all the SWM criteria</li> </ul>                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>Bioswales are a moderate to high capital cost for retrofit but may add value to a neighbourhood, depending on general public opinion</li> </ul>                                                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>Perforated pipes and soakaway pits are a moderate to high capital cost for retrofit and require moderately complex maintenance</li> </ul>                                                                                                                                                                                                                                                                                                                                             |
| Results of Alternative Evaluation                                           | <ul style="list-style-type: none"> <li>This is a preferred alternative because it is the best option to meet the SWM objectives for this pond</li> <li>The expansion may be designed to minimize the tree removal</li> </ul>                                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>This alternative is not preferred because bioswales cannot provide the required level of water quality and erosion control.</li> <li>Another alternative would need to be implemented in conjunction with bioswales in order to meet SWM objectives, making this alternative economically inefficient.</li> <li>The construction and maintenance of bioswales will create short and long term accessibility and visual impacts on residents.</li> </ul>                                                     | <ul style="list-style-type: none"> <li>This alternative is not preferred because infiltration in R.O.W.s cannot provide the required level of water quality and erosion control.</li> <li>Another alternative would need to be implemented in conjunction with infiltration in R.O.W.s in order to meet SWM objectives, making this alternative economically inefficient.</li> <li>The construction of infiltration pipes in R.O.W.s will create short term accessibility, visual and noise impacts on residents.</li> </ul> |



| Table 1 –Evaluation of Conceptual Design Alternatives for Pond #39 (Offline Wetland) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Criteria                                                                             | Alternatives for Pond #39                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                      | Do Nothing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Oil-Grit Separators (OGS)                                                                                                                                                                                                                                                                                                                                     | Convert to Wet Pond                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Alternative Description                                                              | <ul style="list-style-type: none"><li>The pond will continue to function as existing</li><li>Pond #39 is an offline wetland that was built as a dry pond with a 14.35 ha minor drainage area and 10.75 ha major drainage area</li></ul>                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"><li>Total of 1 unit connected to the minor system prior to the outfall</li></ul>                                                                                                                                                                                                                                            | <ul style="list-style-type: none"><li>Earthworks</li><li>Outlet retrofit</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Location in Treatment Train                                                          | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | End of Pipe                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Target SWM Objective(s)                                                              | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Quality Control                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Technical Considerations                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Constructability and accessibility                                                   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>Location is accessible as OGS unit could be installed upstream of the outfall at a manhole within municipal roadways; construction area is required is relatively small</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Erosion and sediment control plan</li></ul> | <ul style="list-style-type: none"><li>Feasible but extensive construction; accessibility is achievable through the adjacent school yard and recreational park</li><li>Requires large amount of earthworks to re-grade the block to suit wet pond design criteria</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Traffic management plans, erosion and sediment control plans</li><li>Wet pond would be more feasible within a larger area; could realign watercourse to gain more usable land area</li></ul> |
| Ability to meet stormwater management objective(s)                                   | <ul style="list-style-type: none"><li>Does not provide for or meet the stormwater management objectives of the City and/or TRCA, for water quality, erosion or quantity control</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul>                                                                                                                                                                                               | <ul style="list-style-type: none"><li>OGS units may be able to provide all required stormwater quality objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Pre-treatment of stormwater runoff with LIDs will enhance the performance of the OGS</li></ul>                                          | <ul style="list-style-type: none"><li>Wet pond could be constructed to meet all SWM quality criteria, but space may be an issue</li><li>Quantity control is required at this location (post to pre up to 100-year event using unit flow rates)</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Wet pond function is enhanced with LIDs as pre-treatment and inlet/outlets can be designed to provide thermal mitigation</li></ul>                                                                             |
| Engineering best practises / Innovative solution                                     | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>OGS and similar units are noted as best management practices</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Pre-treatment of stormwater runoff with LIDs will enhance the performance of the OGS</li></ul>                                                         | <ul style="list-style-type: none"><li>Traditional SWM approach</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Approach may be enhanced by implementing the use of LIDs in conjunction with a wet pond</li></ul>                                                                                                                                                                                                                                                                                              |
| Summary / Recommendations                                                            | <ul style="list-style-type: none"><li>Does not provide for or meet the stormwater management objectives of the City and/or TRCA, for water quality, erosion or quantity control</li></ul>                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"><li>OGS can be effective, low-space option to provide water quality for the wetland</li></ul>                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>Conversion of the wetland to a wet pond can meet the required quality and quantity control stormwater objectives, but space issues may be a setback and constructability is moderate to difficult due to the slopes &amp; existing vegetation</li><li>Watercourse realignment could be an option to gain more land space for the wet pond; however, this is a costly and intensive process</li></ul>                                                                                                                        |
| Natural Environment                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Impacts to wildlife and vegetation habitats                                          | <ul style="list-style-type: none"><li>The current condition of wildlife and vegetation habitats will not change; however if the lack of quality and erosion control causes future erosion in the receiving watercourse or impacts the quality of the water in the watercourse, this could have a negative impact on the future condition of wildlife and vegetation habitats.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul> | <ul style="list-style-type: none"><li>OGS does not physically interfere with the wetland and improves water quality prior to discharge to the wetland</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation required</li></ul>                                                                    | <ul style="list-style-type: none"><li>Construction of a wet pond will require earthworks within the existing wetland habitat, therefore interfering with existing wildlife and vegetation and may include the removal of adult trees</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Fisheries timing windows will be adhered to if required; an ecologist/biologist will be consulted due to proximity to existing watercourse</li></ul>                                                                     |
| Impacts / Improvements based on SAR / ESA                                            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>Meeting water quality criteria will improve water quality of downstream receiving waters</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Use of OGS can be enhanced with pre-treatment using LIDs throughout major and minor system watershed</li></ul>             | <ul style="list-style-type: none"><li>There are opportunities for cooling water before discharging downstream via inlet/outlet structures and other pond details</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Thermal mitigation is not specifically required at this location</li><li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li></ul>                                                                                        |
| Summary / Recommendations                                                            | <ul style="list-style-type: none"><li>Existing wetland and terrestrial vegetation in the pond block provide habitat area and will remain in the current condition</li></ul>                                                                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"><li>OGS offers improvements to water quality</li><li>Used in conjunction with LIDs, OGS can improve water conditions for any sensitive habitats downstream</li></ul>                                                                                                                                                        | <ul style="list-style-type: none"><li>Wet pond can be beneficial to downstream receiving waters but will alter any existing habitat</li><li>Adult trees may be lost during construction</li></ul>                                                                                                                                                                                                                                                                                                                                                                 |
| Social Impacts                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Requirement of                                                                       | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>Likely not required; preference to install and</li></ul>                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>Acquisition of private lands would likely not</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

| Criteria                                                                    | Alternatives for Pond #39                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                             | Do Nothing                                                                                                                                                                            | Oil-Grit Separators (OGS)                                                                                                                                                                                                                                                                                                                                                                               | Convert to Wet Pond                                                                                                                                                                                                                                                                                                                                                                                        |
| easements or purchase of private lands                                      |                                                                                                                                                                                       | <div>maintain OGS within municipal R.O.W., where maintenance is easily accessible</div> <div>Mitigation/Compensation/Enhancement Measures</div> <div><div>▪ Not applicable</div></div>                                                                                                                                                                                                                  | <div>be beneficial for the retrofit due to the nature of the site</div> <div>Mitigation/Compensation/Enhancement Measures</div> <div><div>▪ Land requirements would be confirmed through conceptual design</div></div>                                                                                                                                                                                     |
| Impacts to public and private properties due to construction and operations | N/A                                                                                                                                                                                   | <div><div>▪ Roadway interference and/or short-term closure would be expected for the installation of OGS units</div><div>▪ Temporary interference to be expected on roadways during maintenance (approximately once a year)</div></div> <div>Mitigation/Compensation/Enhancement Measures</div> <div><div>▪ Traffic management plans may reduce inconveniences associated with construction</div></div> | <div><div>▪ Noise and visual impacts associated with construction for the residences backing onto wetland block</div></div> <div>Mitigation/Compensation/Enhancement Measures</div> <div><div>▪ Construction management plan, including restrictions on hours</div><div>▪ A staging area should be set up within the R.O.W. as to not interfere with traffic or private property</div></div>               |
| Effect on public safety                                                     | N/A                                                                                                                                                                                   | <div><div>▪ Installed OGS does not pose threats to public safety</div></div> <div>Mitigation/Compensation/Enhancement Measures</div> <div><div>▪ No mitigation undertaken</div></div>                                                                                                                                                                                                                   | <div><div>▪ Potential use of retaining walls may present a safety concern; however, recreational trails are not present within this immediate area</div></div> <div>Mitigation/Compensation/Enhancement Measures</div> <div><div>▪ Adequate slopes, warning signs, and fencing (if required) will provide measures of safety</div></div>                                                                   |
| Summary / Recommendations                                                   | <div><div>▪ The ‘Do Nothing’ alternative has no social impacts</div></div>                                                                                                            | <div><div>▪ OGS presents few and short-term impacts associated with installation and maintenance</div></div>                                                                                                                                                                                                                                                                                            | <div><div>▪ Conversion of the wetland to a wet pond would be a longer-term construction project with potential noise, traffic and visual impacts</div><div>▪ Potential use of retaining walls will require additional safety measures</div></div>                                                                                                                                                          |
| Economic Considerations                                                     |                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                            |
| Capital costs                                                               | <div><div>▪ No action may result in greater capital expenses in the future</div></div> <div>Mitigation/Compensation/Enhancement Measures</div> <div><div>▪ Not applicable</div></div> | <div><div>▪ Low capital cost for installation of one (1) unit and associated infrastructure works</div></div> <div>Mitigation/Compensation/Enhancement Measures</div> <div><div>▪ Capital cost of OGS units can be reduced if stormwater is pre-treated with LIDs (thus scaling down required OGS size)</div></div>                                                                                     | <div><div>▪ High capital cost for earthworks, grading, infrastructure components, permits</div></div> <div>Mitigation/Compensation/Enhancement Measures</div> <div><div>▪ Capital costs can be marginally reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required detention volumes)</div><div>▪ Costs due to more complex access may be increased</div></div> |
| Maintenance and operating costs                                             | N/A                                                                                                                                                                                   | <div><div>▪ Fairly low maintenance cost and frequency; approximately annually</div></div> <div>Mitigation/Compensation/Enhancement Measures</div> <div><div>▪ Maintenance frequency of OGS units should not decrease with increased pre-treatment</div></div>                                                                                                                                           | <div><div>▪ Moderate maintenance cost and frequency; likely seasonally</div></div> <div>Mitigation/Compensation/Enhancement Measures</div> <div><div>▪ Maintenance frequency should be as directed by operations manual</div></div>                                                                                                                                                                        |
| Impact on future development and growth                                     | N/A                                                                                                                                                                                   | <div><div>▪ Size of OGS is static once installed and would require upgrading if a larger drainage area is directed to it (in order to meet water quality criteria)</div></div> <div>Mitigation/Compensation/Enhancement Measures</div> <div><div>▪ Additional OGS units or upscaled units may be installed in the future to correspond with growth</div></div>                                          | <div><div>▪ Design would limit land use to existing conditions; any proposed intensification within the watershed would likely require on-site controls</div></div> <div>Mitigation/Compensation/Enhancement Measures</div> <div><div>▪ On-site control requirements for any intensified development within the pond’s watershed</div></div>                                                               |
| Summary / Recommendations                                                   | <div><div>▪ ‘Do nothing’ may postpone required works and increase future costs</div></div>                                                                                            | <div><div>▪ Installation of OGS units is a low to moderate cost solution for achievement of the required quality control</div></div>                                                                                                                                                                                                                                                                    | <div><div>▪ Conversion of the wetland to a wet pond would present high capital costs for achievement of all the SWM criteria</div></div>                                                                                                                                                                                                                                                                   |
| Results of Alternative Evaluation                                           | <div><div>▪ This alternative is not preferred because the alternative does not meet the stormwater management objectives</div></div>                                                  | <div><div>▪ This is a preferred alternative due to the lower cost, small disturbance area and ability to provide full quality control</div><div>▪ This alternative can be implemented with little to no loss of existing trees.</div></div>                                                                                                                                                             | <div><div>▪ A wet pond facility would be capable of fully meeting the requirements for quality control</div><div>▪ Retaining existing trees is a high priority for the City of Markham; however tree loss is probable for construction of this alternative. Therefore, this is not a preferred option.</div></div>                                                                                         |

| Criteria                                           | Alternatives for Pond #39                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                    | Construct Forebay                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Retrofit Outlet to Extend Detention                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Underground Storage Tanks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Alternative Description                            | <ul style="list-style-type: none"> <li>Earthworks for construction of berm and increased forebay depth</li> <li>Downstream section of facility will remain as existing and outlet will not be affected</li> </ul>                                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"> <li>Construct upgraded outlet structure to increase the extended detention within existing SWM facility</li> </ul>                                                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Installed in municipal owned lands including parks and the watercourse land parcel</li> <li>Underground storage tanks will capture and detain stormwater and release over an extended time period</li> <li>Infiltration type underground tanks will allow for infiltration during detention period</li> <li>May need water quality control prior to infiltrating (if infiltration is proposed)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                           |
| Location in Treatment Train                        | End of Pipe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Target SWM Objective(s)                            | Quality Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Erosion Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Erosion and Temperature Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Technical Considerations                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Constructability and accessibility                 | <ul style="list-style-type: none"> <li>Feasible and moderately extensive construction; accessibility is achievable through the adjacent school yard and recreational park</li> <li>Requires moderate amount of earthworks to re-grade land to suit forebay design criteria</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Traffic management plans, erosion and sediment control plans</li> <li>Geometry of forebay can be optimized at conceptual design stage, including a low flow channel</li> </ul>             | <ul style="list-style-type: none"> <li>Construction is feasible and within municipally owned lands; accessibility is achievable through the adjacent school yard and recreational park</li> <li>Associated works involving expanding the facility volume may present constructability issues</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Traffic management plans, erosion and sediment control plans</li> </ul>              | <ul style="list-style-type: none"> <li>Footprint may be large and depends on available soil conditions; constructability is low due to minimal elevation difference between storm sewers and the watercourse</li> <li>Still allows for use of land at-grade, so can be proposed under existing recreational fields</li> <li>Requires re-organization of existing outfalls to feed into central underground tank(s)</li> <li>Based on soil mapping, the soil in the drainage area is conducive to infiltration</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Tanks with infiltration capabilities provide additional benefits for erosion and temperature control</li> <li>Site specific soil testing is required to confirm suitability of infiltration</li> </ul> |
| Ability to meet stormwater management objective(s) | <ul style="list-style-type: none"> <li>Forebay could provide water quality control; additional measures required for thermal mitigation and erosion control</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Forebay function could be enhanced with implementation of LIDs throughout watershed</li> <li>Forebay water temperature can be cooled through planting techniques</li> </ul>                                                                                                                               | <ul style="list-style-type: none"> <li>Given the existing wetland block and surrounding area, there is not enough proposed storage capacity to meet the requirement for erosion control</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Retrofit of the outlet would require upgrade of the available storage volume of the facility</li> <li>Erosion control may be facilitated with use of LIDs upstream</li> </ul>             | <ul style="list-style-type: none"> <li>Underground tanks, especially with infiltration capabilities, are effective for providing erosion and temperature control</li> <li>Due to the existing storm sewer elevations and creek elevation, this option would be challenging</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Longer detention times and depth below grade can enhance the erosion and temperature control, respectively</li> </ul>                                                                                                                                                                                                                                                                                                                     |
| Engineering best practises / innovative solution   | <ul style="list-style-type: none"> <li>Typically more traditional SWM approach</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Forebay function can be enhanced with LIDs</li> </ul>                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"> <li>Typically more traditional SWM approach</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Erosion control may be facilitated with use of LIDs upstream</li> </ul>                                                                                                                                                                                                                            | <ul style="list-style-type: none"> <li>Underground tanks, including infiltration, are noted as best management practices</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Maintenance of underground tanks is more extensive than at-grade alternatives</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Summary / Recommendations                          | <ul style="list-style-type: none"> <li>Construction of a forebay can meet SWM criteria within a lesser footprint than a full wet pond; requires additional erosion controls</li> <li>Quantity control would still be outstanding without additional retrofit</li> </ul>                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"> <li>Constructability may be complex due to topography and access of the site</li> <li>Adequate erosion control is not feasible at this site</li> </ul>                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"> <li>Constructability is challenging due to the existing elevation differences</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Natural Environment                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Impacts to wildlife and vegetation habitats        | <ul style="list-style-type: none"> <li>Construction of a forebay will require earthworks partially within the existing wetland habitat, therefore interfering with existing wildlife and vegetation</li> <li>The removal of some trees may be required</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Fisheries and migratory bird timing windows will be adhered to if required; an ecologist/biologist will be consulted</li> <li>Restoration plans will be developed to restore any cleared vegetation</li> </ul> | <ul style="list-style-type: none"> <li>Some vegetation will likely be cleared for retrofit of the facility outlet; low impact</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Fisheries and migratory bird timing windows will be adhered to if required;</li> <li>The retrofit design may be able to retain existing trees in the area</li> <li>Restoration plans will be developed to restore any cleared vegetation</li> </ul> | <ul style="list-style-type: none"> <li>Would require removal of vegetation depending on specific location</li> <li>Once installed, less intrusive than other alternatives because of location below grade</li> <li>May reduce terrestrial habitat</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Restoration plan required if loss of vegetation expected due to construction</li> <li>Migratory bird windows to be adhered to for construction</li> </ul>                                                                                                                                                                                                                                                                                                          |
| Impacts / improvements based on SAR / ESA          | <ul style="list-style-type: none"> <li>There are opportunities for cooling water before discharging downstream via inlet structures and planting techniques</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Thermal mitigation may be improved with the construction of a forebay</li> <li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li> </ul>                                                                                              | <ul style="list-style-type: none"> <li>Opportunities exist for cooling water before discharging downstream via outlet structures</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Can be enhanced with LID measures upstream</li> <li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li> </ul>                                                                | <ul style="list-style-type: none"> <li>Underground tanks may decrease water temperature, providing benefits to the identified SAR</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Summary / Recommendations                          | <ul style="list-style-type: none"> <li>A forebay can be beneficial to downstream receiving waters but will alter any existing habitat within the construction area</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"> <li>Retrofit of the existing outlet will have a low impact to the natural environment</li> <li>If storage volume can be adequately increased,</li> </ul>                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>Underground tanks are a long-term non-invasive alternative for providing erosion and temperature control</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |



|                                                                             | Alternatives for Pond #39                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Criteria                                                                    | Construct Forebay                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Retrofit Outlet to Extend Detention                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Underground Storage Tanks                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|                                                                             | <ul style="list-style-type: none"><li>▪ Loss of existing trees within the pond block</li><li>▪ Quantity control at the site is still required to meet criteria</li></ul>                                                                                                                                                                                                                                                                                               | the retrofit of the outlet can provide required erosion control which will increase water quality                                                                                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"><li>▪ This alternative may be a viable solution to provide erosion and quantity control without disruption to the existing wetland</li></ul>                                                                                                                                                                                                                                                                                             |
| Social Impacts                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Requirement of easements or purchase of private lands                       | <ul style="list-style-type: none"><li>▪ Likely not required; block is relatively large and moderately accessible</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Land requirements would be confirmed through conceptual design</li></ul>                                                                                                                                                                        | <ul style="list-style-type: none"><li>▪ Likely not required; block is relatively large and moderately accessible</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Land requirements would be confirmed through conceptual design</li></ul>                                                                                                                                                                                               | <ul style="list-style-type: none"><li>▪ This alternative would require the acquisition of additional land or an easement</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Land requirements would be confirmed through conceptual design</li></ul>                                                                                                                                                                    |
| Impacts to public and private properties due to construction and operations | <ul style="list-style-type: none"><li>▪ Noise and visual impacts associated with construction for the residences backing onto wetland block at upstream end</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Construction management plan, including restrictions on hours</li><li>▪ A staging area should be set up within the public road R.O.W. as to not interfere with traffic or private property</li></ul> | <ul style="list-style-type: none"><li>▪ Noise and visual impacts associated with construction for the residences backing onto wetland block at upstream end</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Construction management plan, including restrictions on hours</li><li>▪ A staging area should be set up within the public road R.O.W. and municipal parkland as to not interfere with traffic or private property</li></ul> | <ul style="list-style-type: none"><li>▪ Construction anticipated within wetland and/or park lands; impacts may include temporary, minor traffic and noise issues due to proximity to residential neighbourhood</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Proper signage and safety measures to be set up for construction period</li><li>▪ Park land may be restored after construction is completed</li></ul> |
| Effect on public safety                                                     | <ul style="list-style-type: none"><li>▪ By building to the required slope and depth criteria, the forebay should not pose a threat to public safety</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Adequate slopes, warning signs, and fencing (if required) will provide measures of safety</li></ul>                                                                                                          | <ul style="list-style-type: none"><li>▪ Retrofit of the outlet itself has low impact on public safety</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Warning signs and fencing (if required) will provide measures of safety</li></ul>                                                                                                                                                                                                 | <ul style="list-style-type: none"><li>▪ No public safety concerns beyond construction period</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Proper signage and safety measures to be set up for construction period</li></ul>                                                                                                                                                                                       |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>▪ Construction of a forebay would be a longer-term construction project with potential noise, traffic and visual impacts</li><li>▪ Scale of construction is lesser than conversion of wetland to a wet pond</li></ul>                                                                                                                                                                                                            | <ul style="list-style-type: none"><li>▪ Retrofit of the facility outlet itself is of low impact in regards to noise, traffic and land use</li><li>▪ Scale of construction is relatively small</li></ul>                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"><li>▪ Underground tanks are proposed to be located in public lands, generally not intrusive to the public during or after construction</li></ul>                                                                                                                                                                                                                                                                                         |
| Economic Considerations                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Capital costs                                                               | <ul style="list-style-type: none"><li>▪ Moderate capital cost for earthworks, grading, infrastructure components, permits</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Capital costs can be marginally reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required volumes)</li></ul>                                                                                 | <ul style="list-style-type: none"><li>▪ Low to moderate cost for the retrofit of the outlet itself</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Capital costs can be marginally reduced if the extended detention volume does not increase significantly</li></ul>                                                                                                                                                                   | <ul style="list-style-type: none"><li>▪ Moderate to high capital cost related to storage tank infrastructure</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Efficient tank design to minimize capital costs</li><li>▪ Adequate soils and extend of earthworks will affect capital cost</li></ul>                                                                                                                    |
| Maintenance and operating costs                                             | <ul style="list-style-type: none"><li>▪ Moderate maintenance cost and frequency; likely seasonally</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Maintenance frequency should be as directed by operations manual</li></ul>                                                                                                                                                                                    | <ul style="list-style-type: none"><li>▪ Low maintenance cost and frequency; likely seasonally to prevent clogging</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Maintenance frequency should be as directed by operations manual</li></ul>                                                                                                                                                                                            | <ul style="list-style-type: none"><li>▪ Low maintenance costs associated with cleaning out tanks as per operations manual or in event of clogging</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Can prevent clogging with additional pre-treatment techniques</li></ul>                                                                                                                                            |
| Impact on future development and growth                                     | <ul style="list-style-type: none"><li>▪ No impact, but forebay would require further expansion if contributing land use was to intensify</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ On-site control requirements for any intensified development within the forebay’s watershed would mitigate further expansion</li></ul>                                                                                  | <ul style="list-style-type: none"><li>▪ No impacts</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Not applicable</li></ul>                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"><li>▪ No impact, but underground tanks would require expansion if contributing land use was to intensify</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ On-site control requirements for any future intensification within the watershed would mitigate further expansion</li></ul>                                                                                               |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>▪ Construction of a forebay would present moderate capital costs for achievement of quality control</li></ul>                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"><li>▪ Retrofit of the existing outlet to provide the required extended detention is a relatively low cost solution in itself; the corresponding requirement to increase the detention volume will increase the capital cost</li></ul>                                                                                                                                                                                                                       | <ul style="list-style-type: none"><li>▪ Underground tanks can provide reasonable capital and maintenance costs for the achievement of erosion, quantity and temperature control</li><li>▪ Capital costs can fluctuate based on actual conditions at the specific location chosen at conceptual design</li></ul>                                                                                                                                                            |
| Results of Alternative Evaluation                                           | <ul style="list-style-type: none"><li>▪ Retaining existing trees is a high priority for the City of Markham; however tree loss is probable for construction of this alternative. Therefore, this is not a preferred option.</li></ul>                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>▪ This alternative is preferred to provide cost-effective erosion control and can be used in conjunction with the other preferred alternatives.</li></ul>                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>▪ This is a not a preferred alternative due to challenging constructability and the requirement of purchasing additional land</li></ul>                                                                                                                                                                                                                                                                                              |

| Criteria                                           | Alternatives for Pond #39                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                    | Expand Size of Existing Pond                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Bioswales                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Infiltration in Right-of-Ways (R.O.W.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Alternative Description                            | <ul style="list-style-type: none"><li>Expand the existing SWM facility area in terms of volume to provide for adequate permanent pool, active storage, and extended detention</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>Construct bioswales within the road right-of-ways within the facility drainage area</li><li>Bioswales to contain native plantings and subdrains</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"><li>Install perforated secondary pipe within existing storm sewer systems to allow for infiltration through linear soakaway pits</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Location in Treatment Train                        | End of Pipe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Conveyance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Target SWM Objective(s)                            | Quality, and Erosion Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Quality and Erosion Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Technical Considerations                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Constructability and accessibility                 | <ul style="list-style-type: none"><li>Moderate to complex constructability due to the existing vegetation and limited area</li><li>Constructability will also be affected by the total footprint required for the pond</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Efficient design and potential use of retaining walls can increase the constructability of the expanded pond at this site</li></ul>                                                                                                                                                               | <ul style="list-style-type: none"><li>Construction area is extensive and pipe networks are more intricate, requiring coordination with existing infrastructure</li><li>Road right of ways need to be conducive to grading and space criteria for bioswales</li><li>Based on soil mapping, the majority of the drainage area is not ideal for infiltration.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Bioswales may be more suited as supplementary water quality / erosion / temperature control measures, where constructability and retrofit are least disruptive to existing infrastructure</li><li>Site specific soil testing is required to confirm suitability of infiltration</li></ul> | <ul style="list-style-type: none"><li>Construction area is extensive and many secondary infiltration pipes would require to be installed to achieve SWM criteria</li><li>Requires coordination with existing infrastructure and utilities</li><li>Based on soil mapping, the majority of the drainage area is not ideal for infiltration.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may be more suited as supplementary water quality / erosion / temperature control measures, where constructability and retrofit are least disruptive to existing infrastructure</li><li>Site specific soil testing is required to confirm suitability of infiltration</li></ul> |
| Ability to meet stormwater management objective(s) | <ul style="list-style-type: none"><li>With sufficient space to construct, expansion of the facility will provide adequate controls to meet the SWM objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Pre-treatment of stormwater with LIDs can reduce the required expansion volume</li><li>Using the maximum safe slopes will decrease the footprint of the expanded pond</li></ul>                                                                                                                                                                            | <ul style="list-style-type: none"><li>Bioswales are more effective when used within a treatment train to achieve the stormwater objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Additional pre-treatment will enhance the function of bioswales, to reduce clogging of the underdrain pipes</li></ul>                                                                                                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may are more effective when used within a treatment train to achieve the stormwater objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Additional pre-treatment will enhance the function of the perforated pipes, to reduce clogging</li></ul>                                                                                                                                                                                                                                                                                                                                                                             |
| Engineering best practises / innovative solution   | <ul style="list-style-type: none"><li>Typically more traditional SWM approach</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Can be enhanced with use of LIDs within the contributing watershed</li></ul>                                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>Bioswales are innovative solutions within stormwater management conveyance systems</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Enhanced with further use of LIDs such as vegetated filter strips</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may are innovative solutions within stormwater management</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Enhanced with further use of LIDs such as vegetated filter strips</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Summary / Recommendations                          | <ul style="list-style-type: none"><li>Configuration of the existing site does not lend itself particularly well to large-scale retrofit; constructability is enhanced if the expansion is minimized to only the most required SWM objectives</li></ul>                                                                                                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"><li>Bioswales are effective as part of a treatment train and where retrofit does not greatly interfere with existing infrastructure</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may are effective as part of a treatment train and where retrofit does not greatly interfere with existing infrastructure</li><li>Due to the poor infiltration in the soil, Infiltration in the R.O.W. is not a preferred option.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Natural Environment                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Impacts to wildlife and vegetation habitats        | <ul style="list-style-type: none"><li>Expansion of the existing facility will require earthworks within the existing wetland habitat, therefore interfering with existing wildlife and vegetation and may include the removal of adult trees</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Fisheries timing windows will be adhered to if required; an ecologist/biologist will be consulted due to proximity to existing watercourse</li><li>Restoration plan should be developed</li><li>Conceptual design should be done to minimize the removal of trees</li></ul> | <ul style="list-style-type: none"><li>May require removal of some vegetation depending on specific location</li><li>May present phosphorus issues if not properly designed and/or maintained</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Planted bioswales will enhance neighbourhoods with additional vegetated areas</li></ul>                                                                                                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"><li>May require removal of some vegetation depending on specific location; likely few impacts to existing wildlife and vegetation habitats</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Areas disturbed during construction will be restored</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Impacts / improvements based on SAR / ESA          | <ul style="list-style-type: none"><li>There are opportunities for cooling water before discharging downstream via inlet/outlet structures and other pond details</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Thermal mitigation is not specifically required at this location</li><li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li></ul>                                                                                                                                                   | <ul style="list-style-type: none"><li>Bioswales may decrease water temperature, providing benefits to the identified SAR</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Bioswales may be more suited as supplementary water temperature control measures</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) may decrease water temperature, providing benefits to the identified SAR</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may be more suited as supplementary water temperature control measures</li></ul>                                                                                                                                                                                                                                                                                                                                                                                     |
| Summary / Recommendations                          | <ul style="list-style-type: none"><li>Removal of sediment from downstream waters is beneficial to aquatic species</li><li>Conceptual design should minimize the removal of trees</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"><li>Bioswales which are properly designed to avoid phosphorus loading provide positive impact on the natural environment</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits present few impact on the natural environment</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Social Impacts                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

| Criteria                                                                    | Alternatives for Pond #39                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                             | Expand Size of Existing Pond                                                                                                                                                                                                                                                                                                                                                                                                                            | Bioswales                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Infiltration in Right-of-Ways (R.O.W.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Requirement of easements or purchase of private lands                       | <ul style="list-style-type: none"> <li>Acquisition of private lands would likely not be beneficial for the retrofit due to the nature of the site</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Land requirements would be confirmed through conceptual design</li> </ul>                                                                                                                       | <ul style="list-style-type: none"> <li>To be constructed within municipal R.O.W.</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not applicable</li> </ul>                                                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>To be constructed within municipal R.O.W.</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not applicable</li> </ul>                                                                                                                                                                                                                                                                                                             |
| Impacts to public and private properties due to construction and operations | <ul style="list-style-type: none"> <li>Noise and visual impacts associated with construction for the residences backing onto wetland block</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Construction management plan, including restrictions on hours</li> <li>A staging area should be set up within the R.O.W. as to not interfere with traffic or private property</li> </ul>               | <ul style="list-style-type: none"> <li>Impacts may include temporary, minor traffic and noise issues due to construction within the residential streets</li> <li>Bioswales are likely to face public opposition due to the maintenance requirements, visual disruption to an otherwise “clean” front lawn and inconvenience of culverts under driveways</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Appropriate construction and traffic management schedule to be adhered to</li> </ul> | <ul style="list-style-type: none"> <li>Impacts may include temporary, minor traffic and noise issues due to construction within the residential streets</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Appropriate construction and traffic management schedule to be adhered to</li> </ul>                                                                                                                                                                           |
| Effect on public safety                                                     | <ul style="list-style-type: none"> <li>Potential use of retaining walls may present a safety concern; however, recreational trails are not present within this immediate area</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Adequate slopes, warning signs, and fencing (if required) will provide measures of safety</li> </ul>                                                                | <ul style="list-style-type: none"> <li>No public safety concerns beyond construction period</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Proper signage and safety measures to be set up for construction period</li> </ul>                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"> <li>No public safety concerns beyond construction period</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Proper signage and safety measures to be set up for construction period</li> </ul>                                                                                                                                                                                                                                         |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"> <li>Expansion of the wetland to a wet pond would be a longer-term construction project with potential noise, traffic and visual impacts</li> <li>Potential use of retaining walls will require additional safety measures</li> </ul>                                                                                                                                                                                 | <ul style="list-style-type: none"> <li>Impacts during construction are temporary and mostly minor</li> <li>Long term impacts on residents due to visual impacts and culvert maintenance may be significant</li> </ul>                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"> <li>Impacts are minor and mostly temporary, within the construction period</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                     |
| Economic Considerations                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Capital costs                                                               | <ul style="list-style-type: none"> <li>High capital cost for earthworks, grading, infrastructure components, permits</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Capital costs can be marginally reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required detention volumes)</li> <li>Costs due to more complex access may be increased</li> </ul> | <ul style="list-style-type: none"> <li>Moderate to high capital cost related to new pipe infrastructure, earthworks and plantings, as well as likely relocation of existing pipe infrastructure</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Proficient SUE investigation prior to design work can minimize unexpected existing pipe/utility interferences</li> </ul>                                                                                                                     | <ul style="list-style-type: none"> <li>Moderate to high capital cost related to new pipe infrastructure, earthworks and plantings, as well as likely relocation of existing pipe infrastructure</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Proficient SUE investigation prior to design work can minimize unexpected existing pipe/utility interferences</li> </ul>                                                                                               |
| Maintenance and operating costs                                             | <ul style="list-style-type: none"> <li>Moderate maintenance cost and frequency; likely seasonally</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Maintenance frequency should be as directed by operations manual</li> </ul>                                                                                                                                                                     | <ul style="list-style-type: none"> <li>Low to moderate maintenance costs associated with replacing filter media, unclogging perforated pipes</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Pre-treatment of stormwater with grassed filter strips can prevent some clogging of perforated pipes</li> </ul>                                                                                                                                                                                 | <ul style="list-style-type: none"> <li>Moderate maintenance costs associated with unclogging perforated pipes</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Pre-treatment of stormwater with grassed filter strips can prevent some clogging of perforated pipes</li> </ul>                                                                                                                                                                                          |
| Impact on future development and growth                                     | <ul style="list-style-type: none"> <li>Design would limit land use to existing conditions; any proposed intensification within the watershed would likely require on-site controls</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>On-site control requirements for any intensified development within the pond’s watershed</li> </ul>                                                            | <ul style="list-style-type: none"> <li>Retrofit R.O.W. with bioswales may dictate R.O.W. standards for future development</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Bioswales can enhance the aesthetic appeal of a neighbourhood / development and provide an ‘added value’</li> <li>On-site control requirements for any future intensification within the watershed would mitigate negative impacts on the LID</li> </ul>                                                           | <ul style="list-style-type: none"> <li>Retrofit R.O.W. with perforated pipes and soakaway pits may dictate R.O.W. standards for future development</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>On-site control requirements for any future intensification within the watershed would mitigate negative impacts on the LID</li> </ul>                                                                                                                              |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"> <li>Expansion of the wetland to a wet pond would present high capital costs for achievement of all the SWM criteria</li> </ul>                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"> <li>Bioswales are a moderate to high capital cost for retrofit but may add value to a neighbourhood, depending on general public opinion</li> </ul>                                                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>Perforated pipes and soakaway pits are a moderate to high capital cost for retrofit and require moderately complex maintenance</li> </ul>                                                                                                                                                                                                                                                                                                                                             |
| Results of Alternative Evaluation                                           | <ul style="list-style-type: none"> <li>This is a preferred alternative because it is the best option to meet the SWM objectives for this pond</li> <li>The expansion may be designed to minimize the tree removal</li> </ul>                                                                                                                                                                                                                            | <ul style="list-style-type: none"> <li>This alternative is not preferred because bioswales cannot provide the required level of water quality and erosion control.</li> <li>Another alternative would need to be implemented in conjunction with bioswales in order to meet SWM objectives, making this alternative economically inefficient.</li> <li>The construction and maintenance of bioswales will create short and long term accessibility and visual impacts on residents.</li> </ul>                                                     | <ul style="list-style-type: none"> <li>This alternative is not preferred because infiltration in R.O.W.s cannot provide the required level of water quality and erosion control.</li> <li>Another alternative would need to be implemented in conjunction with infiltration in R.O.W.s in order to meet SWM objectives, making this alternative economically inefficient.</li> <li>The construction of infiltration pipes in R.O.W.s will create short term accessibility, visual and noise impacts on residents.</li> </ul> |



| Table 1 –Evaluation of Conceptual Design Alternatives for Pond #45 (Offline Wetland) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Criteria                                                                             | Alternatives for Pond #45                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                                                                                      | Do Nothing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Oil-Grit Separators (OGS)                                                                                                                                                                                                                                                                                                                                                                                   | Convert to Wet Pond                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Alternative Description                                                              | <ul style="list-style-type: none"><li>The pond will continue to function as existing</li><li>Pond #45 is an offline wetland that was built to provide flood control, with a 20.76 ha minor drainage area and a 22.33 ha major drainage areas.</li></ul>                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"><li>Total of 2 units connected to the minor system prior to the outfalls</li></ul>                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"><li>Earthworks</li><li>Outlet retrofit</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Location in Treatment Train                                                          | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | End of Pipe                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Target SWM Objective(s)                                                              | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Quality Control                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Technical Considerations                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Constructability and accessibility                                                   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>Feasible but more extensive construction; accessibility is relatively good</li><li>Proximity to railway needs to be considered in terms of potential additional permits</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Traffic management plans may reduce inconveniences associated with construction</li></ul> | <ul style="list-style-type: none"><li>Feasible but more extensive construction; accessibility is relatively good</li><li>Requires moderate amount of earthworks to re-grade the block to suit wet pond design criteria</li><li>Area appears to be sufficient to design pond to applicable slope/depth criteria; may reduce parkland area</li><li>Proximity to railway needs to be considered in terms of potential additional permits</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Traffic management plans, erosion and sediment control plans, required permits</li></ul> |
| Ability to meet stormwater management objective(s)                                   | <ul style="list-style-type: none"><li>Does not provide for or meet the stormwater management objectives of the City and/or TRCA, for water quality or erosion control</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul>                                                                                                                                                                                                         | <ul style="list-style-type: none"><li>OGS units may be able to provide all required stormwater quality objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Pre-treatment of stormwater runoff with LIDs will enhance the performance of the OGS</li></ul>                                                                                        | <ul style="list-style-type: none"><li>Wet pond could be constructed to meet all SWM quality and erosion criteria</li><li>Quantity control is not required at this location</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Wet pond function is enhanced with LIDs as pre-treatment and inlet/outlets can be designed to provide thermal mitigation</li></ul>                                                                                                                                                                                                                  |
| Engineering best practises / Innovative solution                                     | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>OGS and similar units are noted as best management practices</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Pre-treatment of stormwater runoff with LIDs will enhance the performance of the OGS</li></ul>                                                                                                       | <ul style="list-style-type: none"><li>Traditional SWM approach</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Approach may be enhanced by implementing the use of LIDs in conjunction with a wet pond</li></ul>                                                                                                                                                                                                                                                                                                                                                               |
| Summary / Recommendations                                                            | <ul style="list-style-type: none"><li>Does not provide for or meet the stormwater management objectives of the City and/or TRCA, for water quality or erosion control</li></ul>                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>OGS can be effective, low-space option to provide water quality for the wetland</li></ul>                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"><li>Conversion of the wetland to a wet pond can meet the required quality and erosion objectives as well as aid in thermal mitigation</li><li>Site is accessible for construction</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                      |
| Natural Environment                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Impacts to wildlife and vegetation habitats                                          | <ul style="list-style-type: none"><li>The current condition of wildlife and vegetation habitats will not change; however if the lack of quality and erosion control causes future erosion in the receiving watercourse or impacts the quality of the water in the watercourse, this could have a negative impact on the future condition of wildlife and vegetation habitats.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul> | <ul style="list-style-type: none"><li>OGS does not physically interfere with the wetland and improves water quality prior to discharge to the wetland</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation required</li></ul>                                                                                                                  | <ul style="list-style-type: none"><li>Construction of a wet pond will require earthworks within the existing wetland habitat, therefore interfering with existing wildlife and vegetation and may include the removal of adult trees</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Fisheries and migratory bird timing windows will be adhered to if required; an ecologist/biologist will be consulted if required</li></ul>                                                                                                                                                |
| Impacts / Improvements based on SAR / ESA                                            | <ul style="list-style-type: none"><li>Existing vegetation provides some benefit to reducing water temperature</li><li>By not implementing temperature controls, receiving waters may have higher temperatures over time and this can negatively impact sensitive species such as Redside Dace</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul>                                                                                 | <ul style="list-style-type: none"><li>Meeting water quality criteria will improve water quality of downstream receiving waters</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Use of OGS can be enhanced with pre-treatment using LIDs throughout major and minor system watershed</li></ul>                                                           | <ul style="list-style-type: none"><li>There are opportunities for cooling water before discharging downstream via inlet/outlet structures and other pond details</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Thermal mitigation is recommended if possible at this location</li><li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li></ul>                                                                                                                                                           |
| Summary / Recommendations                                                            | <ul style="list-style-type: none"><li>Existing wetland and terrestrial vegetation in the pond block provide habitat area and will remain in the current condition</li></ul>                                                                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"><li>OGS offers improvements to water quality</li><li>Used in conjunction with LIDs, OGS can improve water conditions for any sensitive habitats downstream</li></ul>                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>Wet pond can be beneficial to downstream receiving waters but will alter any existing habitat</li><li>Adult trees may be lost during construction</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Social Impacts                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Requirement of easements or purchase of private lands                                | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>Not required; preference to install and maintain OGS within municipal R.O.W. or parkland where maintenance is easily accessible</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                                                                                          | <ul style="list-style-type: none"><li>Acquisition of private lands is not required; adequate space on site</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Land requirements would be confirmed through conceptual design</li></ul>                                                                                                                                                                                                                                                                                                                                            |
| Impacts to public                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>Roadway interference and/or short-term</li></ul>                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>Noise and visual impacts may be associated</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

| Criteria                                                  | Alternatives for Pond #45                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                      |
|-----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                           | Do Nothing                                                                                                                                                                 | Oil-Grit Separators (OGS)                                                                                                                                                                                                                                                                                                                                      | Convert to Wet Pond                                                                                                                                                                                                                                                                                                                                                  |
| and private properties due to construction and operations | N/A                                                                                                                                                                        | <div>closure may be expected for the installation of OGS units</div> <div><div>▪ Temporary interference may be expected on roadways during maintenance (approximately once a year)</div></div> <div>Mitigation/Compensation/Enhancement Measures</div> <div><div>▪ Traffic management plans may reduce inconveniences associated with construction</div></div> | <div>with construction of the pond for the residences backing onto wetland block</div> <div>Mitigation/Compensation/Enhancement Measures</div> <div><div>▪ Construction management plan, including restrictions on hours</div><div>▪ A staging area should be set up within the municipal parklands as to not interfere with traffic or private property</div></div> |
| Effect on public safety                                   | N/A                                                                                                                                                                        | <div>▪ Installed OGS does not pose threats to public safety</div> <div>Mitigation/Compensation/Enhancement Measures</div> <div><div>▪ No mitigation undertaken</div></div>                                                                                                                                                                                     | <div>▪ Deeper waters of a pond may present a safety concern; however, use of MOE standard depths and slopes will be applied</div> <div>Mitigation/Compensation/Enhancement Measures</div> <div><div>▪ Adequate slopes, warning signs, and fencing (if required) will provide measures of safety</div></div>                                                          |
| Summary / Recommendations                                 | <div>▪ The ‘Do Nothing’ alternative has no social impacts</div>                                                                                                            | <div>▪ OGS presents few and short-term impacts associated with installation and maintenance</div>                                                                                                                                                                                                                                                              | <div>▪ Conversion of the wetland to a wet pond would be a longer-term construction project with potential noise, traffic and visual impacts</div> <div>▪ Safety is not a significant concern of this alternative at this site</div>                                                                                                                                  |
| Economic Considerations                                   |                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                      |
| Capital costs                                             | <div>▪ No action may result in greater capital expenses in the future</div> <div>Mitigation/Compensation/Enhancement Measures</div> <div><div>▪ Not applicable</div></div> | <div>▪ Low to moderate capital cost for installation of two (2) units and associated infrastructure works</div> <div>Mitigation/Compensation/Enhancement Measures</div> <div><div>▪ Capital cost of OGS units can be reduced if stormwater is pre-treated with LIDs (thus scaling down required OGS size)</div></div>                                          | <div>▪ Moderate capital cost for earthworks, grading, infrastructure components, permits</div> <div>Mitigation/Compensation/Enhancement Measures</div> <div><div>▪ Capital costs can be marginally reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required detention volumes)</div></div>                                |
| Maintenance and operating costs                           | N/A                                                                                                                                                                        | <div>▪ Fairly low maintenance cost and frequency; approximately annually; potentially more if clogged</div> <div>Mitigation/Compensation/Enhancement Measures</div> <div><div>▪ Maintenance frequency of OGS units should not decrease with increased pre-treatment</div></div>                                                                                | <div>▪ Moderate maintenance cost and frequency; likely seasonally</div> <div>Mitigation/Compensation/Enhancement Measures</div> <div><div>▪ Maintenance frequency should be as directed by operations manual</div></div>                                                                                                                                             |
| Impact on future development and growth                   | N/A                                                                                                                                                                        | <div>▪ Size of OGS is static once installed and would require upgrading if a larger drainage area is directed to it (in order to meet water quality criteria)</div> <div>Mitigation/Compensation/Enhancement Measures</div> <div><div>▪ Additional OGS units or upscaled units may be installed in the future to correspond with growth</div></div>            | <div>▪ Design would limit land use to existing conditions; any proposed intensification within the watershed would likely require on-site controls</div> <div>Mitigation/Compensation/Enhancement Measures</div> <div><div>▪ On-site control requirements for any intensified development within the pond’s watershed</div></div>                                    |
| Summary / Recommendations                                 | <div>▪ ‘Do nothing’ may postpone required works and increase future costs</div>                                                                                            | <div>▪ Installation of OGS units is a low to moderate cost solution for achievement of the required quality control</div>                                                                                                                                                                                                                                      | <div>▪ Conversion of the wetland to a wet pond would present moderate to high capital costs for achievement of all the SWM criteria</div>                                                                                                                                                                                                                            |
| Results of Alternative Evaluation                         | <div>▪ This alternative is not preferred because the alternative does not meet the stormwater management objectives</div>                                                  | <div>▪ This is a preferred alternative due to the lower cost, small disturbance area and ability to provide full quality control</div> <div>▪ This alternative can be implemented with little to no loss of existing trees</div>                                                                                                                               | <div>▪ A wet pond facility would be capable of fully meeting the requirements for quality control</div> <div>▪ Retaining existing trees is a high priority for the City of Markham; however tree loss is probable for construction of this alternative. Therefore, this is not a preferred option.</div>                                                             |

| Criteria                                           | Alternatives for Pond #45                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                    | Bottom Draw Outlet in Wet Pond                                                                                                                                                                                                                                                                                                                       | Retrofit Outlet to Extend Detention                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Underground Storage Tanks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Alternative Description                            | <ul style="list-style-type: none"> <li>Construct a bottom draw outlet to reduce temperatures of discharged water.</li> <li>Only applicable if the wetland is converted into a wet pond</li> </ul>                                                                                                                                                    | <ul style="list-style-type: none"> <li>Construct upgraded outlet structure to increase the extended detention within existing SWM facility</li> </ul>                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>Installed in municipal owned lands including parks and the pond land parcel</li> <li>Underground storage tanks will capture and detain stormwater and release over an extended time period</li> <li>Infiltration type underground tanks will allow for infiltration during detention period</li> <li>May need water quality control prior to infiltrating (if infiltration is proposed)</li> </ul>                                                                                                                                                                                                                                                                                                         |
| Location in Treatment Train                        | End of Pipe                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Target SWM Objective(s)                            | Temperature Control                                                                                                                                                                                                                                                                                                                                  | Erosion Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Erosion and Temperature Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Technical Considerations                           |                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Constructability and accessibility                 | <ul style="list-style-type: none"> <li>Constructability is simple, pending adequate depth of the wet pond</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Greater depth enhances the thermal mitigation function of the bottom draw outlet</li> </ul>                                          | <ul style="list-style-type: none"> <li>Construction is feasible and within municipally owned lands</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Erosion and sediment control plans</li> </ul>                                                                                                                                                                                                                               | <ul style="list-style-type: none"> <li>Footprint may be large and depends on available soil conditions; constructability is feasible</li> <li>Still allows for use of land at-grade, so can be proposed under existing recreational land</li> <li>Requires re-organization of existing outfalls to feed into central underground tank(s)</li> <li>Based on soil mapping, the soil in the drainage area is conducive to infiltration.</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Tanks with infiltration capabilities provide additional benefits for erosion and temperature control</li> <li>Site specific soil testing is required to confirm suitability of infiltration</li> </ul> |
| Ability to meet stormwater management objective(s) | <ul style="list-style-type: none"> <li>Bottom draw outlets can be effective in decreasing the temperature of the outlet water</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Thermal mitigation would be best achieved with a combination of LID methods</li> </ul>                           | <ul style="list-style-type: none"> <li>Provided that adequate volume can be made available, the adjustment of the outlet can be an effective solution to provide the required extended detention</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Retrofit of the outlet would require upgrade of the available storage volume of the facility</li> <li>Erosion control may be facilitated with use of LIDs upstream</li> </ul> | <ul style="list-style-type: none"> <li>Underground tanks, especially with infiltration capabilities, are effective for providing erosion and temperature control</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Longer detention times and depth below grade can enhance the erosion and temperature control, respectively</li> </ul>                                                                                                                                                                                                                                                                                                                                                      |
| Engineering best practises / innovative solution   | <ul style="list-style-type: none"> <li>Bottom draw outlets in combination with cooling trenches are recent best management practices</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Thermal mitigation can be enhanced overall with LIDs within the contributing watershed</li> </ul>         | <ul style="list-style-type: none"> <li>Typically more traditional SWM approach</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Erosion control may be facilitated with use of LIDs upstream</li> </ul>                                                                                                                                                                                                                         | <ul style="list-style-type: none"> <li>Underground tanks, including infiltration, are noted as best management practices</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Maintenance of underground tanks is more extensive than at-grade alternatives</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Summary / Recommendations                          | <ul style="list-style-type: none"> <li>A bottom draw outlet is a recommended outlet alternative for the wet pond to achieve required temperature control</li> </ul>                                                                                                                                                                                  | <ul style="list-style-type: none"> <li>Constructability should be straightforward</li> <li>More supplementary alternatives required to provide adequate quality control</li> </ul>                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Technically feasible, requiring more intrusive maintenance</li> <li>Constructability within existing terrain is low to moderate and can be incorporated into existing land uses</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Natural Environment                                |                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Impacts to wildlife and vegetation habitats        | <ul style="list-style-type: none"> <li>No impact to vegetation</li> <li>May impact aquatic habitat, although fish not anticipated within facility</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Effects could be mitigated with appropriate screens and outflow velocities</li> </ul>        | <ul style="list-style-type: none"> <li>Some vegetation will likely be cleared for retrofit of the facility outlet;</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Fisheries and migratory bird timing windows will be adhered to if required;</li> <li>Restoration plans will be developed to restore any cleared vegetation</li> </ul>                                                                                       | <ul style="list-style-type: none"> <li>Would require removal of some vegetation depending on specific location</li> <li>Once installed, less intrusive than other alternatives because of location below grade</li> <li>May reduce terrestrial habitat</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Restoration plan required if loss of vegetation expected due to construction</li> <li>Migratory bird windows to be adhered to for construction</li> <li>Tree loss may be minimized during detailed design</li> </ul>                                                                                                                                                                 |
| Impacts / improvements based on SAR / ESA          | <ul style="list-style-type: none"> <li>Cooling effects are very beneficial for the potential Redside Dace habitat downstream</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Alternative can be enhanced with LIDs within the watershed and planting techniques within the wet pond</li> </ul> | <ul style="list-style-type: none"> <li>Opportunities exist for cooling water before discharging downstream via outlet structures</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Can be enhanced with LID measures upstream</li> <li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li> </ul>                                                             | <ul style="list-style-type: none"> <li>Underground tanks may decrease water temperature, providing benefits to the identified SAR</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li> </ul>                                                                                                                                                                                                                                                                                                                                                                             |
| Summary / Recommendations                          | <ul style="list-style-type: none"> <li>Bottom draw outlet is a simple alternative to incorporate into a wet pond for the achievement of temperature control</li> </ul>                                                                                                                                                                               | <ul style="list-style-type: none"> <li>Retrofit of the existing outlet will have a low impact to the natural environment</li> <li>If storage volume can be adequately increased, the retrofit of the outlet can provide required erosion control which will increase water quality</li> </ul>                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>Underground tanks are a long-term non-invasive alternative for providing erosion and temperature control</li> <li>This alternative may be a viable solution to provide erosion and temperature control without disruption to the existing wetland</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                               |

|                                                                             | Alternatives for Pond #45                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Criteria                                                                    | Bottom Draw Outlet in Wet Pond                                                                                                                                                                                                                                                                            | Retrofit Outlet to Extend Detention                                                                                                                                                                                                                                                                                                                                                                                                                                        | Underground Storage Tanks                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Social Impacts                                                              |                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Requirement of easements or purchase of private lands                       | N/A                                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"> <li>Likely not required; block is relatively large and accessible</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Land requirements would be confirmed through conceptual design</li> </ul>                                                                                                                                                                                       | <ul style="list-style-type: none"> <li>Sufficient space is available within municipal lands</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Land requirements would be confirmed through conceptual design</li> </ul>                                                                                                                                                                                                 |
| Impacts to public and private properties due to construction and operations | <ul style="list-style-type: none"> <li>Impacts are related to the construction of the wet pond</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Bottom draw outlet itself does not present additional impacts</li> </ul>                             | <ul style="list-style-type: none"> <li>Potential noise and visual impacts associated with construction for the residences backing onto wetland / parkland block</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Construction management plan, including restrictions on hours</li> <li>A staging area should be set up within the municipal parkland as to not interfere with traffic or private property</li> </ul> | <ul style="list-style-type: none"> <li>Construction anticipated within wetland and/or park lands; impacts may include temporary, minor traffic and noise issues due to proximity to residential neighbourhood</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Proper signage and safety measures to be set up for construction period</li> <li>Recreational park land will be accessible after restoration</li> </ul> |
| Effect on public safety                                                     | N/A                                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"> <li>Retrofit of the outlet itself has low impact on public safety</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Warning signs and fencing (if required) will provide measures of safety</li> </ul>                                                                                                                                                                              | <ul style="list-style-type: none"> <li>No public safety concerns beyond construction period</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Proper signage and safety measures to be set up for construction period</li> </ul>                                                                                                                                                                                        |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"> <li>There are no social impacts associated with the bottom draw outlet</li> </ul>                                                                                                                                                                                      | <ul style="list-style-type: none"> <li>Retrofit of the facility outlet itself is of low impact in regards to noise, traffic and land use</li> <li>Scale of construction is relatively small</li> </ul>                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"> <li>Underground tanks are proposed to be located in public lands, generally not intrusive to the public during or after construction</li> </ul>                                                                                                                                                                                                                                                                                          |
| Economic Considerations                                                     |                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Capital costs                                                               | <ul style="list-style-type: none"> <li>Low capital cost as standalone item</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>No mitigation required</li> </ul>                                                                                        | <ul style="list-style-type: none"> <li>Low to moderate cost for the retrofit of the outlet itself</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Capital costs can be marginally reduced if the extended detention volume does not increase significantly from existing conditions</li> </ul>                                                                                                                       | <ul style="list-style-type: none"> <li>Moderate capital cost related to storage tank infrastructure</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Efficient tank design to minimize capital costs</li> <li>Adequate soils and extend of earthworks will affect capital cost</li> </ul>                                                                                                                              |
| Maintenance and operating costs                                             | <ul style="list-style-type: none"> <li>Low maintenance costs as standalone; costs associated with maintenance of wet pond</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Maintenance due to clogging can be reduced with proper screens</li> </ul> | <ul style="list-style-type: none"> <li>Low maintenance cost and frequency; likely seasonally to prevent clogging</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Maintenance frequency should be as directed by operations manual</li> </ul>                                                                                                                                                                         | <ul style="list-style-type: none"> <li>Low maintenance costs associated with cleaning out tanks as per operations manual or in event of clogging</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Can prevent clogging with additional pre-treatment techniques</li> </ul>                                                                                                                                             |
| Impact on future development and growth                                     | <ul style="list-style-type: none"> <li>No impacts</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not applicable</li> </ul>                                                                                                                         | <ul style="list-style-type: none"> <li>No impacts</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Limited to the existing land use; higher imperviousness in the watershed would require a larger extended detention volume and therefore altered outlet structure</li> </ul>                                                                                                                                        | <ul style="list-style-type: none"> <li>No impact, but underground tanks would require expansion if contributing land use was to intensify</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>On-site control requirements for any future intensification within the watershed would mitigate further expansion</li> </ul>                                                                                                |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"> <li>Bottom draw outlet is a cost effective alternative to incorporate into wet pond design to meet temperature criteria</li> </ul>                                                                                                                                     | <ul style="list-style-type: none"> <li>Retrofit of the existing outlet to provide the required extended detention is a relatively low cost solution in itself; the corresponding requirement to increase the detention volume will increase the capital cost</li> </ul>                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>Underground tanks can provide reasonable capital and maintenance costs for the achievement of erosion and temperature control</li> <li>Capital costs can fluctuate based on actual conditions at the specific location chosen at conceptual design</li> </ul>                                                                                                                                                                        |
| Results of Alternative Evaluation                                           | <ul style="list-style-type: none"> <li>This alternative is not preferred as it requires the conversion of the pond into a wet pond, which is also not a preferred alternative.</li> </ul>                                                                                                                 | <ul style="list-style-type: none"> <li>This is not a preferred option because there is not adequate volume in the existing pond to achieve full erosion control without expanding the pond, which is not a preferred alternative.</li> </ul>                                                                                                                                                                                                                               | <ul style="list-style-type: none"> <li>This is a preferred alternative because public recreational land can be restored after construction of an underground storage tank as compared to a pond. This alternative would be designed such that it minimizes the number of mature trees affected.</li> </ul>                                                                                                                                                                  |



| Criteria                                              | Alternatives for Pond #45                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
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|                                                       | Infiltration in Right-of-Ways (R.O.W.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Bioswales                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Expand Size of Existing Pond                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Alternative Description                               | <ul style="list-style-type: none"><li>▪ Install perforated secondary pipe within existing storm sewer systems to allow for infiltration through linear soakaway pits</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"><li>▪ Construct bioswales within the road right-of-ways within the facility drainage area</li><li>▪ Bioswales to contain native plantings and subdrains</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>▪ Expand the existing SWM facility area in terms of volume to provide for adequate permanent pool, active storage, and extended detention</li></ul>                                                                                                                                                                                                                                                                                                                                        |
|                                                       | Conveyance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | End of Pipe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                                                       | Quality, Erosion and Temperature Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Quality and Erosion Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Technical Considerations                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Constructability and accessibility                    | <ul style="list-style-type: none"><li>▪ Construction area is extensive and many secondary infiltration pipes would require to be installed to achieve SWM criteria</li><li>▪ Requires coordination with existing infrastructure and utilities</li><li>▪ Based on soil mapping, the soil in the drainage area is conducive to infiltration.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Perforated pipes (exfiltration pipes) and soakaway pits may be more suited as supplementary water quality / erosion / temperature control measures, where constructability and retrofit are least disruptive to existing infrastructure</li><li>▪ Site specific soil testing is required to confirm suitability of infiltration</li></ul> | <ul style="list-style-type: none"><li>▪ Construction area is extensive and pipe networks are more intricate, requiring coordination with existing infrastructure</li><li>▪ Road right of ways need to be conducive to grading and space criteria for bioswales</li><li>▪ Based on soil mapping, the soil in the drainage area is conducive to infiltration.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Bioswales may be more suited as supplementary water quality / erosion / temperature control measures, where constructability and retrofit are least disruptive to existing infrastructure</li><li>▪ Site specific soil testing is required to confirm suitability of infiltration</li></ul> | <ul style="list-style-type: none"><li>▪ Moderate constructability due to extend of earthworks and infrastructure</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Efficient design and access plans can mitigate negative effects of constructability of the pond expansion</li></ul>                                                                                                                                                                                       |
| Ability to meet stormwater management objective(s)    | <ul style="list-style-type: none"><li>▪ Perforated pipes (exfiltration pipes) and soakaway pits may are more effective when used within a treatment train to achieve the stormwater objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Additional pre-treatment will enhance the function of the perforated pipes, to reduce clogging</li></ul>                                                                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"><li>▪ Bioswales are more effective when used within a treatment train to achieve the stormwater objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Additional pre-treatment will enhance the function of bioswales, to reduce clogging of the underdrain pipes</li></ul>                                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>▪ Expansion of the facility will provide adequate controls to meet the SWM objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Pre-treatment of stormwater with LIDs can reduce the required expansion volume</li><li>▪ Using the maximum safe slopes will decrease the footprint of the expanded pond</li></ul>                                                                                                              |
| Engineering best practises / innovative solution      | <ul style="list-style-type: none"><li>▪ Perforated pipes (exfiltration pipes) and soakaway pits may are innovative solutions within stormwater management</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Enhanced with further use of LIDs such as vegetated filter strips</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>▪ Bioswales are innovative solutions within stormwater management conveyance systems</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Enhanced with further use of LIDs such as vegetated filter strips</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>▪ Typically more traditional SWM approach</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Can be enhanced with use of LIDs within the contributing watershed</li></ul>                                                                                                                                                                                                                                                               |
| Summary / Recommendations                             | <ul style="list-style-type: none"><li>▪ Perforated pipes (exfiltration pipes) and soakaway pits may are effective as part of a treatment train and where retrofit does not greatly interfere with existing infrastructure</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"><li>▪ Bioswales are effective as part of a treatment train and where retrofit does not greatly interfere with existing infrastructure</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"><li>▪ Constructability generally not an issue; technically feasible; potential negotiations or permits with neighboring railway lands</li></ul>                                                                                                                                                                                                                                                                                                                                                |
| Natural Environment                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Impacts to wildlife and vegetation habitats           | <ul style="list-style-type: none"><li>▪ May require removal of some vegetation depending on specific location; likely few impacts to existing wildlife and vegetation habitats</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Areas disturbed during construction will be restored</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"><li>▪ May require removal of some vegetation depending on specific location</li><li>▪ May present phosphorus issues if not properly designed and/or maintained</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Planted bioswales will enhance neighbourhoods with additional vegetated areas</li></ul>                                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>▪ Expansion of the existing facility will require earthworks within the existing wetland habitat, therefore interfering with existing wildlife and vegetation</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Fisheries and migratory bird timing windows will be adhered to if required; an ecologist/biologist will be consulted due to proximity to existing watercourse</li><li>▪ Restoration plan should be developed</li></ul> |
| Impacts / improvements based on SAR / ESA             | <ul style="list-style-type: none"><li>▪ Perforated pipes (exfiltration pipes) may decrease water temperature, providing benefits to the identified SAR</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Perforated pipes (exfiltration pipes) and soakaway pits may be more suited as supplementary water temperature control measures</li></ul>                                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>▪ Bioswales may decrease water temperature, providing benefits to the identified SAR</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Bioswales may be more suited as supplementary water temperature control measures</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"><li>▪ There are opportunities for cooling water before discharging downstream via inlet/outlet structures and other pond details</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Thermal mitigation can be provided by inlet/outlet configurations</li><li>▪ Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li></ul>                                                |
| Summary / Recommendations                             | <ul style="list-style-type: none"><li>▪ Perforated pipes (exfiltration pipes) and soakaway pits present few impact on the natural environment</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"><li>▪ Bioswales which are properly designed to avoid phosphorus loading provide positive impact on the natural environment</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"><li>▪ With a proper restoration plan, the impact to natural environment is not high; removal of sediment from downstream waters is beneficial to aquatic species</li></ul>                                                                                                                                                                                                                                                                                                                     |
| Social Impacts                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Requirement of easements or purchase of private lands | <ul style="list-style-type: none"><li>▪ To be constructed within municipal R.O.W.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Not applicable</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>▪ To be constructed within municipal R.O.W.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Not applicable</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"><li>▪ Acquisition of private lands not required for this site</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Land requirements would be confirmed through conceptual design</li></ul>                                                                                                                                                                                                                                                   |
| Impacts to public and private properties due to       | <ul style="list-style-type: none"><li>▪ Impacts may include temporary, minor traffic and noise issues due to construction within the residential streets</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"><li>▪ Impacts may include temporary, minor traffic and noise issues due to construction within the residential streets</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"><li>▪ Noise and visual impacts associated with construction for the residences backing onto wetland block</li></ul>                                                                                                                                                                                                                                                                                                                                                                            |

| Criteria                                | Alternatives for Pond #45                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                         | Infiltration in Right-of-Ways (R.O.W.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Bioswales                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Expand Size of Existing Pond                                                                                                                                                                                                                                                                                                                                                                                                                           |
| construction and operations             | <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Appropriate construction and traffic management schedule to be adhered to</li></ul>                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>▪ Bioswales are likely to face public opposition due to the maintenance requirements, visual disruption to an otherwise “clean” front lawn and inconvenience of culverts under driveways</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Appropriate construction and traffic management schedule to be adhered to</li></ul>                                                                         | <ul style="list-style-type: none"><li>▪ Wetland block is adjacent to recreational park land and expansion would likely occur onto this land</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Construction management plan, including restrictions on hours</li><li>▪ A staging area should be set up within the municipal parkland as to not interfere with traffic or private property</li></ul> |
| Effect on public safety                 | <ul style="list-style-type: none"><li>▪ No public safety concerns beyond construction period</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Proper signage and safety measures to be set up for construction period</li></ul>                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>▪ No public safety concerns beyond construction period</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Proper signage and safety measures to be set up for construction period</li></ul>                                                                                                                                                                                                             | <ul style="list-style-type: none"><li>▪ Conversion to wet pond may appear as a safety hazard since deeper water found within recreational parkland</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Adequate slopes, warning signs, and fencing (if required) will provide measures of safety, all as per the required criteria</li></ul>                                                         |
| Summary / Recommendations               | <ul style="list-style-type: none"><li>▪ Impacts are minor and mostly temporary, within the construction period</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"><li>▪ Impacts during construction are temporary and mostly minor</li><li>▪ Long term impacts on residents due to visual impacts and culvert maintenance may be significant</li></ul>                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>▪ Expansion of the wetland to a wet pond would be a longer-term construction project with potential noise, traffic and visual impacts</li><li>▪ Loss of recreational park space</li><li>▪ Overall, impact not significant due to setback from residential homes and safety measures used throughout construction</li></ul>                                                                                       |
| Economic Considerations                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Capital costs                           | <ul style="list-style-type: none"><li>▪ Moderate to high capital cost related to new pipe infrastructure, earthworks and plantings, as well as likely relocation of existing pipe infrastructure</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Proficient SUE investigation prior to design work can minimize unexpected existing pipe/utility interferences</li></ul>                                                                                                 | <ul style="list-style-type: none"><li>▪ Moderate to high capital cost related to new pipe infrastructure, earthworks and plantings, as well as likely relocation of existing pipe infrastructure</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Proficient SUE investigation prior to design work can minimize unexpected existing pipe/utility interferences</li></ul>                                                                   | <ul style="list-style-type: none"><li>▪ Moderate to high capital cost for earthworks, grading, infrastructure components, permits</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Capital costs can be marginally reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required detention volumes)</li></ul>                                               |
| Maintenance and operating costs         | <ul style="list-style-type: none"><li>▪ Moderate maintenance costs associated with unclogging perforated pipes</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Pre-treatment of stormwater with grassed filter strips can prevent some clogging of perforated pipes</li></ul>                                                                                                                                                                                            | <ul style="list-style-type: none"><li>▪ Low to moderate maintenance costs associated with replacing filter media, unclogging perforated pipes</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Pre-treatment of stormwater with grassed filter strips can prevent some clogging of perforated pipes</li></ul>                                                                                                                               | <ul style="list-style-type: none"><li>▪ Moderate maintenance cost and frequency; likely seasonally</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Maintenance frequency should be as directed by operations manual</li></ul>                                                                                                                                                                    |
| Impact on future development and growth | <ul style="list-style-type: none"><li>▪ Retrofit R.O.W. with perforated pipes and soakaway pits may dictate R.O.W. standards for future development</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ On-site control requirements for any future intensification within the watershed would mitigate negative impacts on the LID</li></ul>                                                                                                                                | <ul style="list-style-type: none"><li>▪ Retrofit R.O.W. with bioswales may dictate R.O.W. standards for future development</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Bioswales can enhance the aesthetic appeal of a neighbourhood / development and provide an ‘added value’</li><li>▪ On-site control requirements for any future intensification within the watershed would mitigate negative impacts on the LID</li></ul>        | <ul style="list-style-type: none"><li>▪ Design would limit land use to existing conditions; any proposed intensification within the watershed would likely require on-site controls</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ On-site control requirements for any intensified development within the pond’s watershed</li></ul>                                                           |
| Summary / Recommendations               | <ul style="list-style-type: none"><li>▪ Perforated pipes and soakaway pits are a moderate to high capital cost for retrofit and require moderately complex maintenance</li></ul>                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>▪ Bioswales are a moderate to high capital cost for retrofit but may add value to a neighbourhood, depending on general public opinion</li></ul>                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>▪ Expansion of the wetland to a wet pond would present high capital costs for achievement of all the SWM criteria</li></ul>                                                                                                                                                                                                                                                                                      |
| Results of Alternative Evaluation       | <ul style="list-style-type: none"><li>▪ This alternative is not preferred because infiltration in R.O.W.s cannot provide the required level of water quality and erosion control.</li><li>▪ Another alternative would need to be implemented in conjunction with infiltration in R.O.W.s in order to meet SWM objectives, making this alternative economically inefficient.</li><li>▪ The construction of infiltration pipes in R.O.W.s will create short term accessibility, visual and noise impacts on residents.</li></ul> | <ul style="list-style-type: none"><li>▪ This alternative is not preferred because bioswales cannot provide the required level of water quality and erosion control.</li><li>▪ Another alternative would need to be implemented in conjunction with bioswales in order to meet SWM objectives, making this alternative economically inefficient.</li><li>▪ The construction and maintenance of bioswales will create short and long term accessibility and visual impacts on residents.</li></ul> | <ul style="list-style-type: none"><li>▪ Retaining existing trees and recreational park land is a high priority for the City of Markham, however the loss of trees and park land is probable for construction of this alternative. Therefore, this is not a preferred alternative.</li></ul>                                                                                                                                                            |

| Criteria                                           | Alternatives for Pond #45                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                    | Cooling Trench                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Aquatic and Riparian Plantings at Facility                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Construct Forebay                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Alternative Description                            | <ul style="list-style-type: none"><li>Excavation of a trench between the pond control structure maintenance hole and the outlet</li><li>Modification of outlet piping infrastructure to discharge into trench</li><li>Installation of stone material and restoration of ground surface</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>Plantings to increase density and area of vegetation cover surrounding facility and within facility to provide shade for cooling of detained water</li></ul>                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"><li>Earthworks for construction of berm and increased forebay depth</li><li>Downstream section of facility will remain as existing and outlet will not be affected</li></ul>                                                                                                                                                                                                                                                                                                                                                        |
| Location in Treatment Train                        | End of Pipe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Target SWM Objective(s)                            | Temperature Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Quality Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Technical Considerations                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Constructability and accessibility                 | <ul style="list-style-type: none"><li>Feasible construction and accessibility may be limited considering railway lands to the north</li><li>Construction footprint is relatively small</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Erosion and sediment control plans required</li></ul>                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>No constructability issues anticipated with adding plantings to proposed facilities</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Plantings enhance temperature control by providing shade</li></ul>                                                                                                                                                                                                     | <ul style="list-style-type: none"><li>Feasible construction and accessibility may be limited considering railway lands to the north</li><li>Requires moderate amount of earthworks to re-grade land to suit forebay design criteria</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Traffic management plans, erosion and sediment control plans</li><li>Geometry of forebay can be optimized at conceptual design stage, including a low flow channel</li></ul>                                                  |
| Ability to meet stormwater management objective(s) | <ul style="list-style-type: none"><li>Cooling trenches can be effective in decreasing the temperature of the outlet water</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Thermal mitigation would be best achieved with a combination of LID methods</li></ul>                                                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>Shade from plantings will reduce the temperature of stormwater at a facility</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Plantings are better used in conjunction with other cooling methods to achieve adequate temperature control</li></ul>                                                                                                                                                         | <ul style="list-style-type: none"><li>Forebay could provide water quality control; additional measures required for thermal mitigation and erosion control</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Forebay function could be enhanced with implementation of LIDs throughout watershed</li><li>Forebay water temperature can be cooled through planting techniques</li></ul>                                                                                                                              |
| Engineering best practises / innovative solution   | <ul style="list-style-type: none"><li>Cooling trenches are a recent best management practice</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Thermal mitigation can be enhanced overall with LIDs within the contributing watershed</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"><li>Temperature control of stormwater in general is becoming an engineering best management practice in areas with sensitive habitats</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Effects of plantings can be enhanced with other methods such as use of a bottom draw outlet</li></ul>                                                                                                                    | <ul style="list-style-type: none"><li>Typically more traditional SWM approach</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Forebay function can be enhanced with LIDs</li></ul>                                                                                                                                                                                                                                                                                                                                |
| Summary / Recommendations                          | <ul style="list-style-type: none"><li>Technically feasible with a small construction footprint</li><li>A cooling trench would help with mitigating the temperature impacts of the SWM pond</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"><li>Plantings at stormwater management facility are a simple alternative to provide additional temperature controls</li></ul>                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>Construction of a forebay can meet SWM criteria within a lesser footprint than a full wet pond; requires additional erosion controls</li><li>Quantity control would still be outstanding without additional retrofit</li></ul>                                                                                                                                                                                                                                                                                                  |
| Natural Environment                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Impacts to wildlife and vegetation habitats        | <ul style="list-style-type: none"><li>Existing vegetation in the work area will be cleared</li><li>All affected areas will be restored</li><li>Results in a net neutral effect to terrestrial habitat</li><li>Reduction of temperature released into the downstream cool-water watercourse will improve the native aquatic habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Appropriate erosion and sediment control measures will be undertaken during construction to reduce any negative impacts to the downstream watercourse</li><li>Restoration plans will be developed for surrounding areas impacted by construction</li></ul> | <ul style="list-style-type: none"><li>Planting native species can enhance the existing wildlife and vegetation</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul>                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>Construction of a forebay will require earthworks partially within the existing wetland habitat, therefore interfering with existing wildlife and vegetation</li><li>The removal of some trees may be required</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Fisheries and migratory bird timing windows will be adhered to if required; an ecologist/biologist will be consulted</li><li>Restoration plans will be developed to restore any cleared vegetation</li></ul> |
| Impacts / improvements based on SAR / ESA          | <ul style="list-style-type: none"><li>There are opportunities to improve the habitat quality of the receiving watercourse by reducing the temperature of flows entering the watercourse</li><li>Cooling effects are very beneficial for Redside Dace habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li></ul>                                                                                                                                                                                                     | <ul style="list-style-type: none"><li>Providing additional shade at stormwater facilities reduces stormwater temperature which is a key benefit for SAR habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Effects of plantings can be enhanced with other methods such as use of a bottom draw outlet</li><li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li></ul> | <ul style="list-style-type: none"><li>There are opportunities for cooling water before discharging downstream via inlet structures and planting techniques</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Thermal mitigation may be improved with the construction of a forebay</li><li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li></ul>                                                                                             |
| Summary / Recommendations                          | <ul style="list-style-type: none"><li>A cooling trench at the pond outlet is a relatively simple alternative to mitigate temperatures impacts of the wet pond for the achievement of temperature control</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>Plantings at stormwater facilities provide positive impacts on the natural environment (provided they are non-invasive species)</li></ul>                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>A forebay can be beneficial to downstream receiving waters but will alter any existing habitat within the construction area</li><li>Loss of existing trees within the pond block</li><li>Quantity control at the site is still required to meet criteria</li></ul>                                                                                                                                                                                                                                                              |

| Criteria                                                                    | Alternatives for Pond #45                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                             | Cooling Trench                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Aquatic and Riparian Plantings at Facility                                                                                                                                                                                                                                                     | Construct Forebay                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Social Impacts                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Requirement of easements or purchase of private lands                       | <ul style="list-style-type: none"><li>▪ Not required</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Not applicable</li></ul>                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>▪ Not applicable (unless required in conjunction with stormwater facility construction)</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Not applicable</li></ul>                                   | <ul style="list-style-type: none"><li>▪ Likely not required; block is relatively large and moderately accessible</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Land requirements would be confirmed through conceptual design</li></ul>                                                                                                                                                                                                                                                                                                                                |
| Impacts to public and private properties due to construction and operations | <ul style="list-style-type: none"><li>▪ Noise and visual impacts associated with construction for the residences backing onto proposed SWM facility block</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Construction management plan, including restrictions on hours may reduce inconveniences associated with construction</li></ul>                                                                                     | <ul style="list-style-type: none"><li>▪ No impacts to public</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Not applicable</li></ul>                                                                                                    | <ul style="list-style-type: none"><li>▪ Noise and visual impacts associated with construction for the residences backing onto wetland block at upstream end</li><li>▪ Wetland block is adjacent to recreational park land and expansion would likely occur onto this land</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Construction management plan, including restrictions on hours</li><li>▪ Loss of recreational park space</li><li>▪ A staging area should be set up within the public road R.O.W. as to not interfere with traffic or private property</li></ul> |
| Effect on public safety                                                     | <ul style="list-style-type: none"><li>▪ The cooling trench will not have any affects on public safety once constructed</li><li>▪ During construction there is a potential safety risk due to excavation if a member of the public was to enter the site</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ The construction site should be secured during and after construction hours with warning signs and fencing</li></ul> | <ul style="list-style-type: none"><li>▪ Vegetation should be suitable for proposed facility and clearly indicate any water’s edge</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Vegetation at facilities must be maintained</li></ul>  | <ul style="list-style-type: none"><li>▪ By building to the required slope and depth criteria, the forebay should not pose a threat to public safety</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Adequate slopes, warning signs, and fencing (if required) will provide measures of safety</li></ul>                                                                                                                                                                                                                                                                  |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>▪ No long term social impacts associated with the cooling trench</li><li>▪ Minimal disturbance to the public may occur during construction but the construction time frame will be brief</li></ul>                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>▪ No significant social impacts of plantings at stormwater facilities</li></ul>                                                                                                                                                                          | <ul style="list-style-type: none"><li>▪ Construction of a forebay would be a longer-term construction project with potential noise, traffic and visual impacts</li><li>▪ Scale of construction is lesser than conversion of wetland to a wet pond</li></ul>                                                                                                                                                                                                                                                                                                                                                                    |
| Economic Considerations                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Capital costs                                                               | <ul style="list-style-type: none"><li>▪ Low capital cost for a relatively small excavation and materials</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Capital costs can be marginally reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required trench volume)</li></ul>                                                                                                        | <ul style="list-style-type: none"><li>▪ Low capital cost relative to other alternatives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Costs may vary depending on extents and types of plantings</li></ul>                             | <ul style="list-style-type: none"><li>▪ Moderate capital cost for earthworks, grading, infrastructure components, permits</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Capital costs can be marginally reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required volumes)</li></ul>                                                                                                                                                                                                                                         |
| Maintenance and operating costs                                             | <ul style="list-style-type: none"><li>▪ Low maintenance cost associated with cleaning out the trench</li><li>▪ Lower maintenance frequency; likely once per year, ideally not requiring access to railway lands</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Maintenance frequency should be as directed by operations manual</li></ul>                                                                                   | <ul style="list-style-type: none"><li>▪ Low maintenance costs with native, sustainable plantings</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Lower maintenance plants will minimize costs of maintenance and/or replanting</li></ul> | <ul style="list-style-type: none"><li>▪ Moderate maintenance cost and frequency; likely seasonally</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Maintenance frequency should be as directed by operations manual</li></ul>                                                                                                                                                                                                                                                                                                                                            |
| Impact on future development and growth                                     | <ul style="list-style-type: none"><li>▪ No impacts</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Not applicable</li></ul>                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>▪ No impact on future development</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Not applicable</li></ul>                                                                                         | <ul style="list-style-type: none"><li>▪ No impact, but forebay would require further expansion if contributing land use was to intensify</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ On-site control requirements for any intensified development within the forebay’s watershed would mitigate further expansion</li></ul>                                                                                                                                                                                                                                          |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>▪ A cooling trench is a cost effective alternative to meet temperature criteria</li></ul>                                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"><li>▪ Plantings at SWM facilities are a low cost alternative for providing temperature control</li></ul>                                                                                                                                                     | <ul style="list-style-type: none"><li>▪ Construction of a forebay would present moderate capital costs for achievement of quality control</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Results of Alternative Evaluation                                           | <ul style="list-style-type: none"><li>▪ This alternative preferred because it is a minimally invasive best management practice for temperature control. A cooling trench is cost effective and requires minimal maintenance.</li><li>▪ Construction can be designed such that it does not affect adult trees.</li></ul>                                                                                                                                                            | <ul style="list-style-type: none"><li>▪ This alternative is preferred because it will improve/maintain existing habitat and vegetation</li><li>▪ This alternative provides temperature control at a relatively low capital cost.</li></ul>                                                     | <ul style="list-style-type: none"><li>▪ Retaining existing trees and recreational park land is a high priority for the City of Markham, however the loss of trees and park land is probable for construction of this alternative. Therefore, this is not a preferred alternative.</li></ul>                                                                                                                                                                                                                                                                                                                                    |



| Table 1 –Evaluation of Conceptual Design Alternatives for Pond #47 (Offline Pond) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Criteria                                                                          | Alternatives for Pond #47                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                   | Do Nothing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Oil-Grit Separators (OGS)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Retrofit Outlet to Extend Detention                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Alternative Description                                                           | <ul style="list-style-type: none"> <li>The pond will continue to function as existing</li> <li>Pond #47 is an offline extended detention wet pond with a 23.01 ha minor drainage area and a 23.19 ha major drainage area</li> </ul>                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"> <li>Total of 1 unit connected to the minor system prior to the outfall</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>Construct upgraded outlet structure to increase the extended detention within existing SWM facility</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                         |
| Location in Treatment Train                                                       | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | End of Pipe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Target SWM Objective(s)                                                           | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Quality Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Erosion Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Technical Considerations                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Constructability and accessibility                                                | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"> <li>Location is accessible as OGS unit could be installed upstream of the outfall at a manhole within municipal roadways; construction area required is relatively small</li> <li>Construction considerations may include traffic interruptions and short term road closures</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Traffic management plans may reduce inconveniences associated with construction</li> </ul> | <ul style="list-style-type: none"> <li>Construction is feasible and within municipally owned lands</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Erosion and sediment control plans</li> </ul>                                                                                                                                                                                                                                                                                                        |
| Ability to meet stormwater management objective(s)                                | <ul style="list-style-type: none"> <li>Does not provide for or meet the stormwater management objectives of the City and/or TRCA, for water quality or erosion</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>No mitigation undertaken</li> </ul>                                                                                                                                                                                                                 | <ul style="list-style-type: none"> <li>OGS unit may be able to provide all required stormwater quality objectives</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Pre-treatment of stormwater runoff with LIDs will enhance the performance of the OGS</li> </ul>                                                                                                                                                                                          | <ul style="list-style-type: none"> <li>Provided that adequate volume can be made available, the adjustment of the outlet can be an effective solution to provide the required extended detention</li> <li>Construction disturbance outweighs erosion control improvements</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Retrofit of the outlet would require upgrade of the available storage volume of the facility</li> <li>Erosion control may be facilitated with use of LIDs upstream</li> </ul> |
| Engineering best practises / Innovative solution                                  | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"> <li>OGS and similar units are noted as best management practices</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Pre-treatment of stormwater runoff with LIDs will enhance the performance of the OGS</li> </ul>                                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>Typically more traditional SWM approach</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Erosion control may be facilitated with use of LIDs upstream</li> </ul>                                                                                                                                                                                                                                                                                                  |
| Summary / Recommendations                                                         | <ul style="list-style-type: none"> <li>Does not provide for or meet the stormwater management objectives of the City and/or TRCA, for water quality or erosion</li> </ul>                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>OGS can be effective, low-space option to provide water quality for the pond</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Constructability should be straightforward; may require relocation of existing trail</li> <li>Negative impacts of construction may not outweigh erosion control improvements</li> <li>More supplementary alternatives required to provide adequate quality control</li> </ul>                                                                                                                                                                                                                                          |
| Natural Environment                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Impacts to wildlife and vegetation habitats                                       | <ul style="list-style-type: none"> <li>The current condition of wildlife and vegetation habitats will not change; however if the lack of quality and erosion control causes future erosion in the receiving watercourse or impacts the quality of the water in the watercourse, this could have a negative impact on the future condition of wildlife and vegetation habitats.</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>No mitigation undertaken</li> </ul> | <ul style="list-style-type: none"> <li>OGS does not physically interfere with the pond and improves water quality prior to discharge to the pond</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>No mitigation required</li> </ul>                                                                                                                                                                                                                         | <ul style="list-style-type: none"> <li>Some vegetation will likely be cleared for retrofit of the facility outlet;</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Fisheries and migratory bird timing windows will be adhered to if required;</li> <li>Restoration plans will be developed to restore any cleared vegetation</li> <li>Trees removal will be minimized during conceptual design</li> </ul>                                                                                              |
| Impacts / Improvements based on SAR / ESA                                         | <ul style="list-style-type: none"> <li>Existing vegetation provides some benefit to reducing water temperature</li> <li>By not implementing temperature controls, receiving waters may have higher temperatures over time and this can negatively impact sensitive species such as Redside Dace</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>No mitigation undertaken</li> </ul>                                                                                | <ul style="list-style-type: none"> <li>Meeting water quality criteria will improve water quality of downstream receiving waters</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Use of OGS can be enhanced with pre-treatment using LIDs throughout major and minor system watershed</li> </ul>                                                                                                                                                            | <ul style="list-style-type: none"> <li>Opportunities exist for cooling water before discharging downstream via outlet structures</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Can be enhanced with LID measures upstream</li> <li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li> </ul>                                                                                                                                      |
| Summary / Recommendations                                                         | <ul style="list-style-type: none"> <li>Existing vegetation of pond provides some benefit regarding thermal regulation</li> <li>Increasing water temperatures decrease water quality and affect the health of aquatic species</li> <li>Existing aquatic and terrestrial vegetation in the pond block provide habitat area and will remain in the current condition</li> </ul>                                                                                                                                             | <ul style="list-style-type: none"> <li>OGS offers improvements to water quality</li> <li>Used in conjunction with LIDs, OGS can improve water conditions for any sensitive habitats downstream</li> </ul>                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>Retrofit of the existing outlet will have a low impact to the natural environment</li> <li>If storage volume can be adequately increased, the retrofit of the outlet can provide required erosion control which will increase water quality</li> </ul>                                                                                                                                                                                                                                                                 |
| Social Impacts                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Requirement of easements or purchase of private lands                             | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"> <li>Not required; preference to install and maintain OGS within municipal R.O.W. or parkland where maintenance is easily accessible</li> </ul> <b>Mitigation/Compensation/Enhancement</b>                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"> <li>Not required; block is accessible</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Land requirements would be confirmed through conceptual design</li> </ul>                                                                                                                                                                                                                                                                                                      |

|                                                                             | Alternatives for Pond #47                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Criteria                                                                    | Do Nothing                                                                                                                                                                                                                            | Oil-Grit Separators (OGS)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Retrofit Outlet to Extend Detention                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                             |                                                                                                                                                                                                                                       | <b>Measures</b> <ul style="list-style-type: none"> <li>Not applicable</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Impacts to public and private properties due to construction and operations | N/A                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Roadway interference and/or short-term closure may be expected for the installation of OGS units</li> <li>Temporary interference may be expected on roadways during maintenance (approximately once a year)</li> <li>Recreational park land may be affected during construction</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Traffic management plans may reduce inconveniences associated with construction</li> <li>Recreational park land should be available after restoration</li> </ul> | <ul style="list-style-type: none"> <li>Potential noise and visual impacts associated with construction for the residences near the pond block</li> <li>Recreational park land may be affected during construction</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Construction management plan, including restrictions on hours</li> <li>A staging area should be set up within the municipal parkland as to not interfere with traffic or private property</li> <li>Recreational park land should be available after restoration</li> </ul> |
| Effect on public safety                                                     | N/A                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Installed OGS does not pose threats to public safety</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>No mitigation undertaken</li> </ul>                                                                                                                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"> <li>Retrofit of the outlet itself has low impact on public safety</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Warning signs and fencing (if required) will provide measures of safety</li> </ul>                                                                                                                                                                                                                                                                                                      |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"> <li>The ‘Do Nothing’ alternative has no social impacts</li> </ul>                                                                                                                                  | <ul style="list-style-type: none"> <li>OGS presents few and short-term impacts associated with installation and maintenance</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>Retrofit of the facility outlet itself is of low impact in regards to noise, traffic and land use</li> <li>Scale of construction is relatively small</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                             |
| Economic Considerations                                                     |                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Capital costs                                                               | <ul style="list-style-type: none"> <li>No action may result in greater capital expenses in the future</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not applicable</li> </ul> | <ul style="list-style-type: none"> <li>Low capital cost for installation of one (1) unit and associated infrastructure works</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Capital cost of OGS units can be reduced if stormwater is pre-treated with LIDs (thus scaling down required OGS size)</li> </ul>                                                                                                                                                                                                                           | <ul style="list-style-type: none"> <li>Low to moderate cost for the retrofit of the outlet itself</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Capital costs can be marginally reduced if the extended detention volume does not increase significantly from existing conditions</li> </ul>                                                                                                                                                                                                                                               |
| Maintenance and operating costs                                             | N/A                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Fairly low maintenance cost and frequency; approximately annually; potentially more if clogged</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Maintenance frequency of OGS units should not decrease with increased pre-treatment</li> </ul>                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>Low maintenance cost and frequency; likely seasonally to prevent clogging</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Maintenance frequency should be as directed by operations manual</li> </ul>                                                                                                                                                                                                                                                                                                 |
| Impact on future development and growth                                     | N/A                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Size of OGS is static once installed and would require upgrading if a larger drainage area is directed to it (in order to meet water quality criteria)</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Additional OGS units or upscaled units may be installed in the future to correspond with growth</li> </ul>                                                                                                                                                                                | <ul style="list-style-type: none"> <li>No impacts</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Limited to the existing land use; higher imperviousness in the watershed would require a larger extended detention volume and therefore altered outlet structure</li> </ul>                                                                                                                                                                                                                                                                |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"> <li>‘Do nothing’ may postpone required works and increase future costs</li> </ul>                                                                                                                  | <ul style="list-style-type: none"> <li>Installation of OGS units is a low cost solution for achievement of most of the required quality control</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>Retrofit of the existing outlet to provide the required extended detention is a relatively low cost solution in itself; the corresponding requirement to increase the detention volume will increase the capital cost</li> </ul>                                                                                                                                                                                                                                                                                                                            |
| Results of Alternative Evaluation                                           | <ul style="list-style-type: none"> <li>This alternative is not preferred because the alternative does not meet the stormwater management objectives</li> </ul>                                                                        | <ul style="list-style-type: none"> <li>This is a preferred alternative due to the lower cost, small disturbance area and ability to provide full quality control</li> <li>This alternative can be implemented with little to no loss of existing trees</li> </ul>                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>This alternative is not preferred because the negatives of construction outweigh the erosion control improvements.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                               |

|                                                    | Alternatives for Pond #47                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Criteria                                           | Bottom Draw Outlet in Wet Pond                                                                                                                                                                                                                                                                                                                   | Cooling Trench                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Underground Storage Tanks / Infiltration Galleries                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Alternative Description                            | <ul style="list-style-type: none"><li>Construct a bottom draw outlet to reduce temperatures of discharged water.</li></ul>                                                                                                                                                                                                                       | <ul style="list-style-type: none"><li>Excavation of a trench between the pond control structure maintenance hole and the outlet</li><li>Modification of outlet piping infrastructure to discharge into trench</li><li>Installation of stone material and restoration of ground surface</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>Ideally installed in municipally owned lands including parks and the pond land parcel</li><li>Underground storage tanks / infiltration galleries will capture and detain stormwater and release over an extended time period, similar to soakaway pits</li><li>Infiltration type underground tanks will allow for infiltration during detention period</li><li>May need water quality control prior to infiltrating (if infiltration is proposed)</li></ul>                                                                                                                                                                         |
| Location in Treatment Train                        | End of Pipe                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Target SWM Objective(s)                            | Temperature Control                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Erosion and Temperature Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Technical Considerations                           |                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Constructability and accessibility                 | <ul style="list-style-type: none"><li>Existing pond outlet does not allow for simple retrofit to a bottom draw outlet</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Greater depth enhances the thermal mitigation function of the bottom draw outlet</li></ul>                             | <ul style="list-style-type: none"><li>Feasible construction and accessibility is good</li><li>Construction footprint is relatively small</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Erosion and sediment control plans required</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>Footprints can be small, but additional space must be found throughout the watershed, upstream of the existing SWM pond</li><li>Requires re-organization of some existing storm infrastructure</li><li>Based on soil mapping, the soil in the drainage area is conducive to infiltration</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Tanks / infiltration galleries with infiltration capabilities provide additional benefits for erosion control upstream of the SWM pond</li><li>Site specific soil testing is required to confirm suitability of infiltration</li></ul> |
| Ability to meet stormwater management objective(s) | <ul style="list-style-type: none"><li>Bottom draw outlets can be effective in decreasing the temperature of the outlet water</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Thermal mitigation would be best achieved with a combination of LID methods</li></ul>                           | <ul style="list-style-type: none"><li>Cooling trenches can be effective in decreasing the temperature of the outlet water</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Thermal mitigation would be best achieved with a combination of LID methods</li></ul>                                                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>Underground tanks, especially with infiltration capabilities, are effective for providing erosion and temperature control</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Longer detention times enhance erosion control and help the pond to function with fewer sedimentation issues</li></ul>                                                                                                                                                                                                                                                                                |
| Engineering best practises / innovative solution   | <ul style="list-style-type: none"><li>Bottom draw outlets in combination with cooling trenches are recent best management practices</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Thermal mitigation can be enhanced overall with LIDs within the contributing watershed</li></ul>         | <ul style="list-style-type: none"><li>Cooling trenches are a recent best management practice</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Thermal mitigation can be enhanced overall with LIDs within the contributing watershed</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"><li>Underground tanks, including infiltration, are noted as best management practices</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Maintenance of underground tanks / infiltration galleries is more extensive than at-grade alternatives</li></ul>                                                                                                                                                                                                                                                                                                                              |
| Summary / Recommendations                          | <ul style="list-style-type: none"><li>A bottom draw outlet is a recommended outlet alternative for the wet pond to achieve required temperature control</li></ul>                                                                                                                                                                                | <ul style="list-style-type: none"><li>Technically feasible with a small construction footprint</li><li>A cooling trench would help with mitigating the temperature impacts of the SWM pond</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"><li>Technically feasible, requiring more intrusive maintenance</li><li>Constructability within existing terrain is low to moderate and can be incorporated into existing lands such as parks and R.O.W.s</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Natural Environment                                |                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Impacts to wildlife and vegetation habitats        | <ul style="list-style-type: none"><li>No impact to vegetation</li><li>May impact aquatic habitat, although fish not anticipated within facility</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Effects could be mitigated with appropriate screens and outflow velocities</li></ul>         | <ul style="list-style-type: none"><li>Existing vegetation in the work area will be cleared</li><li>All affected areas will be restored</li><li>Results in a net neutral effect to terrestrial habitat</li><li>Reduction of temperature released into the downstream cool-water watercourse will improve the native aquatic habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Appropriate erosion and sediment control measures will be undertaken during construction to reduce any negative impacts to the downstream watercourse</li><li>Restoration plans will be developed for surrounding areas impacted by construction</li></ul> | <ul style="list-style-type: none"><li>May require removal of some vegetation depending on specific location</li><li>Once installed, less intrusive than other alternatives because of location below grade</li><li>May reduce terrestrial habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Restoration plan required if loss of vegetation expected due to construction</li><li>Construction can be designed to retain trees</li></ul>                                                                                                                                                                         |
| Impacts / improvements based on SAR / ESA          | <ul style="list-style-type: none"><li>Cooling effects are very beneficial for the potential Redside Dace habitat downstream</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Alternative can be enhanced with LIDs within the watershed and planting techniques within the wet pond</li></ul> | <ul style="list-style-type: none"><li>There are opportunities to improve the habitat quality of the receiving watercourse by reducing the temperature of flows entering the watercourse</li><li>Cooling effects are very beneficial for Redside Dace habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li></ul>                                                                                                                                                                                                     | <ul style="list-style-type: none"><li>Underground tanks may decrease water temperature, providing benefits to the identified SAR</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li></ul>                                                                                                                                                                                                                                                                                                         |
| Summary / Recommendations                          | <ul style="list-style-type: none"><li>Bottom draw outlet is a simple alternative to incorporate into a wet pond for the achievement of temperature control</li></ul>                                                                                                                                                                             | <ul style="list-style-type: none"><li>A cooling trench at the pond outlet is a relatively simple alternative to mitigate temperatures impacts of the wet pond for the achievement of temperature control</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>Underground tanks / infiltration galleries are a long-term non-invasive alternative for providing erosion control</li><li>This alternative may be a viable solution to</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

| Criteria                                                                    | Alternatives for Pond #47                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                             | Bottom Draw Outlet in Wet Pond                                                                                                                                                                                                                                                                            | Cooling Trench                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Underground Storage Tanks / Infiltration Galleries                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                             |                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | provide erosion control without disruption to the existing pond volume                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Social Impacts                                                              |                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Requirement of easements or purchase of private lands                       | N/A                                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"> <li>Not required</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not applicable</li> </ul>                                                                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"> <li>Sufficient space is appears to be available within municipal park lands and/or school yard</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>If school yard provides the best available space to construct an infiltration gallery, a form of compensation may be negotiated</li> </ul>                                                                                                                                                   |
| Impacts to public and private properties due to construction and operations | <ul style="list-style-type: none"> <li>Impacts are related to the construction of the wet pond</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Bottom draw outlet itself does not present additional impacts</li> </ul>                             | <ul style="list-style-type: none"> <li>Noise and visual impacts associated with construction for the residences near the SWM facility block</li> <li>Possible loss of recreational park land during construction</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Construction management plan, including restrictions on hours may reduce inconveniences associated with construction</li> <li>Recreational park land may be restored after installation</li> </ul> | <ul style="list-style-type: none"> <li>Construction preferred to be within municipal park lands; impacts may include temporary, minor traffic and noise issues due to proximity to residential neighbourhood</li> <li>Loss of recreational park land during construction</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Proper signage and safety measures to be set up for construction period</li> <li>Recreational park land may be restored after installation</li> </ul> |
| Effect on public safety                                                     | N/A                                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"> <li>The cooling trench will not have any affects on public safety once constructed</li> <li>During construction there is a potential safety risk due to excavation if a member of the public was to enter the site</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>The construction site should be secured during and after construction hours with warning signs and fencing</li> </ul>                                         | <ul style="list-style-type: none"> <li>No public safety concerns beyond construction period</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Proper signage and safety measures to be set up for construction period</li> </ul>                                                                                                                                                                                                                                                 |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"> <li>There are no social impacts associated with the bottom draw outlet</li> </ul>                                                                                                                                                                                      | <ul style="list-style-type: none"> <li>No long term social impacts associated with the cooling trench</li> <li>Minimal disturbance to the public may occur during construction but the construction time frame will be brief</li> </ul>                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Underground tanks / infiltration galleries are proposed to be ideally located in public lands, generally not intrusive to the public during or after construction</li> </ul>                                                                                                                                                                                                                                                                                                                  |
| Economic Considerations                                                     |                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Capital costs                                                               | <ul style="list-style-type: none"> <li>Low capital cost as standalone item</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>No mitigation required</li> </ul>                                                                                        | <ul style="list-style-type: none"> <li>Low capital cost for a relatively small excavation and materials</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Capital costs can be marginally reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required trench volume)</li> </ul>                                                                                                                                               | <ul style="list-style-type: none"> <li>Moderate capital cost related to storage tank / infiltration gallery infrastructure</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Efficient tank design to minimize capital costs</li> <li>Adequate soils and extend of earthworks will affect capital cost</li> </ul>                                                                                                                                                                |
| Maintenance and operating costs                                             | <ul style="list-style-type: none"> <li>Low maintenance costs as standalone; costs associated with maintenance of wet pond</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Maintenance due to clogging can be reduced with proper screens</li> </ul> | <ul style="list-style-type: none"> <li>Low maintenance cost associated with cleaning out the trench</li> <li>Lower maintenance frequency; likely once per year</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Maintenance frequency should be as directed by operations manual</li> </ul>                                                                                                                                                                          | <ul style="list-style-type: none"> <li>Low maintenance costs associated with cleaning out tanks / galleries as per operations manual or in event of clogging</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Can prevent clogging with additional pre-treatment techniques</li> </ul>                                                                                                                                                                                          |
| Impact on future development and growth                                     | <ul style="list-style-type: none"> <li>No impacts</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not applicable</li> </ul>                                                                                                                         | <ul style="list-style-type: none"> <li>No impacts</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not applicable</li> </ul>                                                                                                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"> <li>No impact, but underground tanks would require expansion if contributing land use was to intensify</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>On-site control requirements for any future intensification within the watershed would mitigate further expansion</li> </ul>                                                                                                                                                         |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"> <li>Bottom draw outlet is a cost effective alternative to incorporate into wet pond design to meet temperature criteria</li> </ul>                                                                                                                                     | <ul style="list-style-type: none"> <li>A cooling trench is a cost effective alternative to meet temperature criteria</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"> <li>Underground tanks can provide reasonable capital and maintenance costs for the achievement of erosion control</li> <li>Capital costs can fluctuate based on actual conditions at the specific location chosen at conceptual design</li> </ul>                                                                                                                                                                                                                                                 |
| Results of Alternative Evaluation                                           | <ul style="list-style-type: none"> <li>This is not a preferred alternative because of the complexity of the retrofit due to the existing outlet infrastructure</li> </ul>                                                                                                                                 | <ul style="list-style-type: none"> <li>This alternative is preferred because it is a minimally invasive best management practice for temperature control. A cooling trench is cost effective and requires minimal maintenance.</li> <li>Construction can be designed such that it does not affect adult trees and can be restored such that recreational park land is available.</li> </ul>                                                                                                                               | <ul style="list-style-type: none"> <li>This alternative is preferred because it may be constructed such that it minimizes the number of adult trees affected and allows for the use of the existing public recreational park after construction.</li> </ul>                                                                                                                                                                                                                                                                          |



| Criteria                                              | Alternatives for Pond #47                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
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|                                                       | Infiltration in Right-of-Ways (R.O.W.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Bioswales                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Expand Size of Existing Pond                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Alternative Description                               | <ul style="list-style-type: none"><li>▪ Install perforated secondary pipe within existing storm sewer systems to allow for infiltration through linear soakaway pits</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"><li>▪ Construct bioswales within the road right-of-ways within the facility drainage area</li><li>▪ Bioswales to contain native plantings and subdrains</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"><li>▪ Expand the existing SWM facility area in terms of volume to provide for adequate permanent pool and extended detention volume</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|                                                       | Conveyance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | End of Pipe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                                                       | Quality, Erosion and Temperature Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Quality and Erosion Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Technical Considerations                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Constructability and accessibility                    | <ul style="list-style-type: none"><li>▪ Construction area is extensive and many secondary infiltration pipes would require to be installed to achieve SWM criteria</li><li>▪ Requires coordination with existing infrastructure and utilities</li><li>▪ Based on soil mapping, the soil in the drainage area is conducive to infiltration</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Perforated pipes (exfiltration pipes) and soakaway pits may be more suited as supplementary water quality / erosion / temperature control measures, where constructability and retrofit are least disruptive to existing infrastructure</li><li>▪ Site specific soil testing is required to confirm suitability of infiltration</li></ul> | <ul style="list-style-type: none"><li>▪ Construction area is extensive and pipe networks are more intricate, requiring coordination with existing infrastructure</li><li>▪ Road right of ways need to be conducive to grading and space criteria for bioswales</li><li>▪ Based on soil mapping, the soil in the drainage area is conducive to infiltration</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Bioswales may be more suited as supplementary water quality / erosion / temperature control measures, where constructability and retrofit are least disruptive to existing infrastructure</li><li>▪ Site specific soil testing is required to confirm suitability of infiltration</li></ul> | <ul style="list-style-type: none"><li>▪ Moderate constructability due to extend of earthworks and infrastructure</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Efficient design and access plans can mitigate negative effects of constructability of the pond expansion</li></ul>                                                                                                                                                                                                                                                                       |
| Ability to meet stormwater management objective(s)    | <ul style="list-style-type: none"><li>▪ Perforated pipes (exfiltration pipes) and soakaway pits may are more effective when used within a treatment train to achieve the stormwater objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Additional pre-treatment will enhance the function of the perforated pipes, to reduce clogging</li></ul>                                                                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"><li>▪ Bioswales are more effective when used within a treatment train to achieve the stormwater objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Additional pre-treatment will enhance the function of bioswales, to reduce clogging of the underdrain pipes</li></ul>                                                                                                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"><li>▪ Expansion of the facility will provide adequate controls to meet the SWM objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Pre-treatment of stormwater with LIDs can reduce the required expansion volume</li><li>▪ Using the maximum safe slopes will decrease the footprint of the expanded pond</li></ul>                                                                                                                                                                                              |
| Engineering best practises / innovative solution      | <ul style="list-style-type: none"><li>▪ Perforated pipes (exfiltration pipes) and soakaway pits may are innovative solutions within stormwater management</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Enhanced with further use of LIDs such as vegetated filter strips</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>▪ Bioswales are innovative solutions within stormwater management conveyance systems</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Enhanced with further use of LIDs such as vegetated filter strips</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"><li>▪ Typically more traditional SWM approach</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Can be enhanced with use of LIDs within the contributing watershed</li></ul>                                                                                                                                                                                                                                                                                                                                               |
| Summary / Recommendations                             | <ul style="list-style-type: none"><li>▪ Perforated pipes (exfiltration pipes) and soakaway pits may are effective as part of a treatment train and where retrofit does not greatly interfere with existing infrastructure</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"><li>▪ Bioswales are effective as part of a treatment train and where retrofit does not greatly interfere with existing infrastructure</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"><li>▪ Constructability generally not an issue; technically feasible and within municipal parkland</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Natural Environment                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Impacts to wildlife and vegetation habitats           | <ul style="list-style-type: none"><li>▪ May require removal of some vegetation depending on specific location; likely few impacts to existing wildlife and vegetation habitats</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Areas disturbed during construction will be restored</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"><li>▪ May require removal of some vegetation depending on specific location</li><li>▪ May present phosphorus issues if not properly designed and/or maintained</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Planted bioswales will enhance neighbourhoods with additional vegetated areas</li></ul>                                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>▪ Expansion of the existing facility will require earthworks within the existing pond habitat, therefore interfering with existing wildlife and vegetation which may have established itself</li><li>▪ May include the removal of adult trees</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Fisheries and migratory bird timing windows will be adhered to if required; an ecologist/biologist will be consulted due to proximity to existing watercourse</li><li>▪ Restoration plan should be developed</li></ul> |
| Impacts / improvements based on SAR / ESA             | <ul style="list-style-type: none"><li>▪ Perforated pipes (exfiltration pipes) may decrease water temperature, providing benefits to the identified SAR</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Perforated pipes (exfiltration pipes) and soakaway pits may be more suited as supplementary water temperature control measures</li></ul>                                                                                                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"><li>▪ Bioswales may decrease water temperature, providing benefits to the identified SAR</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Bioswales may be more suited as supplementary water temperature control measures</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>▪ There are opportunities for cooling water before discharging downstream via inlet/outlet structures and other pond details</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Thermal mitigation can be provided by inlet/outlet configurations</li><li>▪ Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li></ul>                                                                                                                                |
| Summary / Recommendations                             | <ul style="list-style-type: none"><li>▪ Perforated pipes (exfiltration pipes) and soakaway pits present few impact on the natural environment</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"><li>▪ Bioswales which are properly designed to avoid phosphorus loading provide positive impact on the natural environment</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"><li>▪ With a proper restoration plan, the impact to natural environment is not high; removal of sediment from downstream waters is beneficial to aquatic species</li><li>▪ Adult trees may be lost during construction</li></ul>                                                                                                                                                                                                                                                                                                                                               |
| Social Impacts                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Requirement of easements or purchase of private lands | <ul style="list-style-type: none"><li>▪ To be constructed within municipal R.O.W.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Not applicable</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"><li>▪ To be constructed within municipal R.O.W.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Not applicable</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"><li>▪ Acquisition of private lands not required for this site</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Land requirements would be confirmed through conceptual design</li></ul>                                                                                                                                                                                                                                                                                                                                   |

| Criteria                                                                    | Alternatives for Pond #47                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                             | Infiltration in Right-of-Ways (R.O.W.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Bioswales                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Expand Size of Existing Pond                                                                                                                                                                                                                                                                                                                                                                              |
| Impacts to public and private properties due to construction and operations | <ul style="list-style-type: none"><li>Impacts may include temporary, minor traffic and noise issues due to construction within the residential streets</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Appropriate construction and traffic management schedule to be adhered to</li></ul>                                                                                                                                                                           | <ul style="list-style-type: none"><li>Impacts may include temporary, minor traffic and noise issues due to construction within the residential streets</li><li>Bioswales are likely to face public opposition due to the maintenance requirements, visual disruption to an otherwise “clean” front lawn and inconvenience of culverts under driveways</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Appropriate construction and traffic management schedule to be adhered to</li></ul> | <ul style="list-style-type: none"><li>Noise and visual impacts near pond block</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Construction management plan, including restrictions on hours</li><li>A staging area should be set up within the municipal parkland as to not interfere with traffic or private property</li></ul>                     |
| Effect on public safety                                                     | <ul style="list-style-type: none"><li>No public safety concerns beyond construction period</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Proper signage and safety measures to be set up for construction period</li></ul>                                                                                                                                                                                                                                         | <ul style="list-style-type: none"><li>No public safety concerns beyond construction period</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Proper signage and safety measures to be set up for construction period</li></ul>                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"><li>Expansion of wet pond may appear as a safety hazard since water depths may increase slightly within recreational parkland</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Adequate slopes, warning signs, and fencing (if required) will provide measures of safety, all as per the required criteria</li></ul> |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>Impacts are minor and mostly temporary, within the construction period</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"><li>Impacts during construction are temporary and mostly minor</li><li>Long term impacts on residents due to visual impacts and culvert maintenance may be significant</li></ul>                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"><li>Expansion of the pond would be a longer-term construction project with potential noise, traffic and visual impacts</li><li>Overall, impact not significant due to setback from residential homes and safety measures used throughout construction</li></ul>                                                                                                         |
| Economic Considerations                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                           |
| Capital costs                                                               | <ul style="list-style-type: none"><li>Moderate to high capital cost related to new pipe infrastructure, earthworks and plantings, as well as likely relocation of existing pipe infrastructure</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Proficient SUE investigation prior to design work can minimize unexpected existing pipe/utility interferences</li></ul>                                                                                               | <ul style="list-style-type: none"><li>Moderate to high capital cost related to new pipe infrastructure, earthworks and plantings, as well as likely relocation of existing pipe infrastructure</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Proficient SUE investigation prior to design work can minimize unexpected existing pipe/utility interferences</li></ul>                                                                                                                    | <ul style="list-style-type: none"><li>Moderate to high capital cost for earthworks, grading, infrastructure components, permits</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Capital costs can be marginally reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required detention volumes)</li></ul>      |
| Maintenance and operating costs                                             | <ul style="list-style-type: none"><li>Moderate maintenance costs associated with unclogging perforated pipes</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Pre-treatment of stormwater with grassed filter strips can prevent some clogging of perforated pipes</li></ul>                                                                                                                                                                                          | <ul style="list-style-type: none"><li>Low to moderate maintenance costs associated with replacing filter media, unclogging perforated pipes</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Pre-treatment of stormwater with grassed filter strips can prevent some clogging of perforated pipes</li></ul>                                                                                                                                                                                | <ul style="list-style-type: none"><li>Moderate maintenance cost and frequency; likely seasonally</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Maintenance frequency should be as directed by operations manual</li></ul>                                                                                                                           |
| Impact on future development and growth                                     | <ul style="list-style-type: none"><li>Retrofit R.O.W. with perforated pipes and soakaway pits may dictate R.O.W. standards for future development</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>On-site control requirements for any future intensification within the watershed would mitigate negative impacts on the LID</li></ul>                                                                                                                              | <ul style="list-style-type: none"><li>Retrofit R.O.W. with bioswales may dictate R.O.W. standards for future development</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Bioswales can enhance the aesthetic appeal of a neighbourhood / development and provide an ‘added value’</li><li>On-site control requirements for any future intensification within the watershed would mitigate negative impacts on the LID</li></ul>                                                           | <ul style="list-style-type: none"><li>Design would limit land use to existing conditions; any proposed intensification within the watershed would likely require on-site controls</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>On-site control requirements for any intensified development within the pond’s watershed</li></ul>                  |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>Perforated pipes and soakaway pits are a moderate to high capital cost for retrofit and require moderately complex maintenance</li></ul>                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>Bioswales are a moderate to high capital cost for retrofit but may add value to a neighbourhood, depending on general public opinion</li></ul>                                                                                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"><li>Expansion of the wet pond would present high capital costs for achievement of all the SWM criteria</li></ul>                                                                                                                                                                                                                                                        |
| Results of Alternative Evaluation                                           | <ul style="list-style-type: none"><li>This alternative is not preferred because infiltration in R.O.W.s cannot provide the required level of water quality and erosion control.</li><li>Another alternative would need to be implemented in conjunction with infiltration in R.O.W.s in order to meet SWM objectives, making this alternative economically inefficient.</li><li>The construction of infiltration pipes in R.O.W.s will create short term accessibility, visual and noise impacts on residents.</li></ul> | <ul style="list-style-type: none"><li>This alternative is not preferred because bioswales cannot provide the required level of water quality and erosion control.</li><li>Another alternative would need to be implemented in conjunction with bioswales in order to meet SWM objectives, making this alternative economically inefficient.</li><li>The construction and maintenance of bioswales will create short and long term accessibility and visual impacts on residents.</li></ul>                                                    | <ul style="list-style-type: none"><li>Retaining existing trees is a high priority for the City of Markham; however tree loss is probable for construction of this alternative. Therefore, this is not a preferred option.</li></ul>                                                                                                                                                                       |

| Criteria                                                                    | Alternatives for Pond #47                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |  |
|-----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
|                                                                             | Aquatic and Riparian Plantings at Facility                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |  |
| Alternative Description                                                     | <ul style="list-style-type: none"><li>Plantings to increase density and area of vegetation cover surrounding facility and within facility to provide shade for cooling of detained water</li></ul>                                                                                                                                                                                                                                                                                                   |  |  |
| Location in Treatment Train                                                 | End of Pipe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |  |
| Target SWM Objective(s)                                                     | Temperature Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |  |
| Technical Considerations                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |  |
| Constructability and accessibility                                          | <ul style="list-style-type: none"><li>No constructability issues anticipated with adding plantings to proposed facilities</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Plantings enhance temperature control by providing shade</li></ul>                                                                                                                                                                                                     |  |  |
| Ability to meet stormwater management objective(s)                          | <ul style="list-style-type: none"><li>Shade from plantings will reduce the temperature of stormwater at a facility</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Plantings are better used in conjunction with other cooling methods to achieve adequate temperature control</li></ul>                                                                                                                                                         |  |  |
| Engineering best practises / innovative solution                            | <ul style="list-style-type: none"><li>Temperature control of stormwater in general is becoming an engineering best management practice in areas with sensitive habitats</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Effects of plantings can be enhanced with other methods such as use of a bottom draw outlet</li></ul>                                                                                                                    |  |  |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>Plantings at stormwater management facility are a simple alternative to provide additional temperature controls</li></ul>                                                                                                                                                                                                                                                                                                                                      |  |  |
| Natural Environment                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |  |
| Impacts to wildlife and vegetation habitats                                 | <ul style="list-style-type: none"><li>Planting native species can enhance the existing wildlife and vegetation</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul>                                                                                                                                                                                                                                                |  |  |
| Impacts / improvements based on SAR / ESA                                   | <ul style="list-style-type: none"><li>Providing additional shade at stormwater facilities reduces stormwater temperature which is a key benefit for SAR habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Effects of plantings can be enhanced with other methods such as use of a bottom draw outlet</li><li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li></ul> |  |  |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>Plantings at stormwater facilities provide positive impacts on the natural environment (provided they are non-invasive species)</li></ul>                                                                                                                                                                                                                                                                                                                      |  |  |
| Social Impacts                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |  |
| Requirement of easements or purchase of private lands                       | <ul style="list-style-type: none"><li>Not applicable (unless required in conjunction with stormwater facility construction)</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                                                                                                                                                                                                                             |  |  |
| Impacts to public and private properties due to construction and operations | <ul style="list-style-type: none"><li>No impacts to public</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                                                                                                                                                                                                                                                                                              |  |  |
| Effect on public safety                                                     | <ul style="list-style-type: none"><li>Vegetation should be suitable for proposed facility and clearly indicate any water’s edge</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Vegetation at facilities must be maintained</li></ul>                                                                                                                                                                                                            |  |  |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>No significant social impacts of plantings at stormwater facilities</li></ul>                                                                                                                                                                                                                                                                                                                                                                                  |  |  |
| Economic Considerations                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |  |
| Capital costs                                                               | <ul style="list-style-type: none"><li>Low capital cost relative to other alternatives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b>                                                                                                                                                                                                                                                                                                                                                  |  |  |

| Criteria                                | Alternatives for Pond #47                                                                                                                                                                                                                                                                      |  |  |
|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
|                                         | Aquatic and Riparian Plantings at Facility                                                                                                                                                                                                                                                     |  |  |
|                                         | <ul style="list-style-type: none"><li>▪ Costs may vary depending on extents and types of plantings</li></ul>                                                                                                                                                                                   |  |  |
| Maintenance and operating costs         | <ul style="list-style-type: none"><li>▪ Low maintenance costs with native, sustainable plantings</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Lower maintenance plants will minimize costs of maintenance and/or replanting</li></ul> |  |  |
| Impact on future development and growth | <ul style="list-style-type: none"><li>▪ No impact on future development</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Not applicable</li></ul>                                                                                         |  |  |
| Summary / Recommendations               | <ul style="list-style-type: none"><li>▪ Plantings at SWM facilities are a low cost alternative for providing temperature control</li></ul>                                                                                                                                                     |  |  |
| Results of Alternative Evaluation       | <ul style="list-style-type: none"><li>▪ This alternative is preferred because it will improve existing habitat and vegetation</li><li>▪ This alternative provides temperature control at a relatively low capital cost.</li></ul>                                                              |  |  |



| Table 1 –Evaluation of Conceptual Design Alternatives for Pond #51 (Offline Wetland) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Criteria                                                                             | Alternatives for Pond #51                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                                                                                      | Do Nothing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Oil-Grit Separators (OGS)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Convert to Wet Pond                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Alternative Description                                                              | <ul style="list-style-type: none"><li>The pond will continue to function as existing</li><li>Pond #51 is an offline wetland that was built to provide flood control, with a56.96 ha minor drainage area and a 60.23 ha major drainage area.</li></ul>                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>Total of 1 unit connected to the minor system prior to the outfall</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>Earthworks</li><li>Outlet retrofit</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Location in Treatment Train                                                          | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | End of Pipe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Target SWM Objective(s)                                                              | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Quality Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Technical Considerations                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Constructability and accessibility                                                   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>Location is accessible as OGS unit could be installed upstream of the outfall at a manhole within municipal roadways or lands; construction area is required is relatively small</li><li>Construction considerations may include traffic interruptions and short term road closures</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Traffic management plans may reduce inconveniences associated with construction</li></ul> | <ul style="list-style-type: none"><li>Feasible but extensive construction; accessibility is relatively good</li><li>Requires moderate amount of earthworks to re-grade the block to suit wet pond design criteria</li><li>Area appears to be sufficient to design pond to applicable slope/depth criteria</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Traffic management plans, erosion and sediment control plans, required permits</li></ul>                                                                                                  |
| Ability to meet stormwater management objective(s)                                   | <ul style="list-style-type: none"><li>Does not provide for or meet the stormwater management objectives of the City and/or TRCA, for water quality or erosion control</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul>                                                                                                                                                                                                         | <ul style="list-style-type: none"><li>OGS units may be able to provide all required stormwater quality objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Pre-treatment of stormwater runoff with LIDs will enhance the performance of the OGS</li></ul>                                                                                                                                                                                                    | <ul style="list-style-type: none"><li>Wet pond could be constructed to meet all SWM quality and erosion criteria</li><li>Quantity control is not required at this location</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Wet pond function is enhanced with LIDs as pre-treatment and inlet/outlets can be designed to provide thermal mitigation</li></ul>                                                                                                                                                                                       |
| Engineering best practises / Innovative solution                                     | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>OGS and similar units are noted as best management practices</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Pre-treatment of stormwater runoff with LIDs will enhance the performance of the OGS</li></ul>                                                                                                                                                                                                                   | <ul style="list-style-type: none"><li>Traditional SWM approach</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Approach may be enhanced by implementing the use of LIDs in conjunction with a wet pond</li></ul>                                                                                                                                                                                                                                                                                                                                    |
| Summary / Recommendations                                                            | <ul style="list-style-type: none"><li>Does not provide for or meet the stormwater management objectives of the City and/or TRCA, for water quality or erosion control</li></ul>                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>OGS can be effective, low-space option to provide water quality for the wetland</li></ul>                                                                                                                                                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"><li>Conversion of the wetland to a wet pond can meet the required quality and erosion objectives as well as aid in thermal mitigation</li><li>Site is appropriate for larger-scale construction</li></ul>                                                                                                                                                                                                                                                                                                                                                             |
| Natural Environment                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Impacts to wildlife and vegetation habitats                                          | <ul style="list-style-type: none"><li>The current condition of wildlife and vegetation habitats will not change; however if the lack of quality and erosion control causes future erosion in the receiving watercourse or impacts the quality of the water in the watercourse, this could have a negative impact on the future condition of wildlife and vegetation habitats.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul> | <ul style="list-style-type: none"><li>OGS does not physically interfere with the wetland and improves water quality prior to discharge to the wetland</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation required</li></ul>                                                                                                                                                                                                                              | <ul style="list-style-type: none"><li>Construction of a wet pond will require earthworks within the existing wetland habitat, therefore interfering with existing wildlife and vegetation</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Fisheries and migratory bird timing windows will be adhered to if required; an ecologist/biologist will be consulted due to proximity to existing watercourse</li><li>Retaining existing trees is a high priority and the wet pond may be designed such that these trees may remain as existing</li></ul> |
| Impacts / Improvements based on SAR / ESA                                            | <ul style="list-style-type: none"><li>Existing vegetation provides some benefit to reducing water temperature</li><li>By not implementing temperature controls, receiving waters may have higher temperatures over time and this can negatively impact sensitive species such as Redside Dace</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul>                                                                                 | <ul style="list-style-type: none"><li>Meeting water quality criteria will improve water quality of downstream receiving waters</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Use of OGS can be enhanced with pre-treatment using LIDs throughout major and minor system watershed</li></ul>                                                                                                                                                                       | <ul style="list-style-type: none"><li>There are opportunities for cooling water before discharging downstream via inlet/outlet structures and other pond details</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Thermal mitigation is recommended if possible at this location</li><li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li></ul>                                                                                                                                |
| Summary / Recommendations                                                            | <ul style="list-style-type: none"><li>Existing wetland and terrestrial vegetation in the pond block provide habitat area and will remain in the current condition</li></ul>                                                                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"><li>OGS offers improvements to water quality</li><li>Used in conjunction with LIDs, OGS can improve water conditions for any sensitive habitats downstream</li></ul>                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>Wet pond can be beneficial to downstream receiving waters but will alter any existing habitat</li><li>The pond may be designed to avoid the removal of trees</li></ul>                                                                                                                                                                                                                                                                                                                                                                                            |
| Social Impacts                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Requirement of easements or purchase of private lands                                | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>Not required; preference to install and maintain OGS within municipal R.O.W. or parkland where maintenance is easily accessible</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b>                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"><li>Acquisition of private lands is not required; adequate space on site</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Land requirements would be confirmed through conceptual design</li></ul>                                                                                                                                                                                                                                                                                                                 |

| Criteria                                                                    | Alternatives for Pond #51                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                             | Do Nothing                                                                                                                                                                                                                            | Oil-Grit Separators (OGS)                                                                                                                                                                                                                                                                                                                                                                                                                            | Convert to Wet Pond                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                                                                             |                                                                                                                                                                                                                                       | <ul style="list-style-type: none"><li>▪ Not applicable</li></ul>                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Impacts to public and private properties due to construction and operations | N/A                                                                                                                                                                                                                                   | <ul style="list-style-type: none"><li>▪ Roadway interference and/or short-term closure may be expected for the installation of OGS units</li><li>▪ Temporary interference may be expected on roadways during maintenance (approximately once a year)</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Traffic management plans may reduce inconveniences associated with construction</li></ul> | <ul style="list-style-type: none"><li>▪ Noise and visual impacts may be associated with construction of the pond for the residences backing onto wetland block; however setback appears sufficient</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Construction management plan, including restrictions on hours</li><li>▪ A staging area should be set up within the municipal parklands as to not interfere with traffic or private property</li></ul> |
| Effect on public safety                                                     | N/A                                                                                                                                                                                                                                   | <ul style="list-style-type: none"><li>▪ Installed OGS does not pose threats to public safety</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ No mitigation undertaken</li></ul>                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>▪ Deeper waters of a pond may present a safety concern; however, use of MOE standard depths and slopes will be applied</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Adequate slopes, warning signs, and fencing (if required) will provide measures of safety</li></ul>                                                                                                                                         |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>▪ The ‘Do Nothing’ alternative has no social impacts</li></ul>                                                                                                                                  | <ul style="list-style-type: none"><li>▪ OGS presents few and short-term impacts associated with installation and maintenance</li></ul>                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>▪ Conversion of the wetland to a wet pond would be a longer-term construction project with potential noise, traffic and visual impacts</li><li>▪ Safety is not a significant concern of this alternative at this site</li></ul>                                                                                                                                                                                                                                          |
| Economic Considerations                                                     |                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Capital costs                                                               | <ul style="list-style-type: none"><li>▪ No action may result in greater capital expenses in the future</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Not applicable</li></ul> | <ul style="list-style-type: none"><li>▪ Low capital cost for installation of one (1) unit and associated infrastructure works</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Capital cost of OGS units can be reduced if stormwater is pre-treated with LIDs (thus scaling down required OGS size)</li></ul>                                                                                  | <ul style="list-style-type: none"><li>▪ Moderate to high capital cost for earthworks, grading, infrastructure components, permits</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Capital costs can be marginally reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required detention volumes)</li></ul>                                                                                                       |
| Maintenance and operating costs                                             | N/A                                                                                                                                                                                                                                   | <ul style="list-style-type: none"><li>▪ Fairly low maintenance cost and frequency; approximately annually; potentially more if clogged</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Maintenance frequency of OGS units should not decrease with increased pre-treatment</li></ul>                                                                                                           | <ul style="list-style-type: none"><li>▪ Moderate maintenance cost and frequency; likely seasonally</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Maintenance frequency should be as directed by operations manual</li></ul>                                                                                                                                                                                                                            |
| Impact on future development and growth                                     | N/A                                                                                                                                                                                                                                   | <ul style="list-style-type: none"><li>▪ Size of OGS is static once installed and would require upgrading if a larger drainage area is directed to it (in order to meet water quality criteria)</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Additional OGS units or upscaled units may be installed in the future to correspond with growth</li></ul>                                       | <ul style="list-style-type: none"><li>▪ Design would limit land use to existing conditions; any proposed intensification within the watershed would likely require on-site controls</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ On-site control requirements for any intensified development within the pond’s watershed</li></ul>                                                                                                                   |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>▪ ‘Do nothing’ may postpone required works and increase future costs</li></ul>                                                                                                                  | <ul style="list-style-type: none"><li>▪ Installation of OGS units is a fairly low cost solution for achievement of most of the required SWM criteria</li></ul>                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"><li>▪ Conversion of the wetland to a wet pond would present moderate to high capital costs for achievement of all the SWM criteria</li></ul>                                                                                                                                                                                                                                                                                                                                 |
| Results of Alternative Evaluation                                           | <ul style="list-style-type: none"><li>▪ This alternative is not preferred because the alternative does not meet the stormwater management objectives</li></ul>                                                                        | <ul style="list-style-type: none"><li>▪ This is not a preferred alternative because this does not fully meet the stormwater objectives compared to the other alternatives that were evaluated for this site</li></ul>                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>▪ This alternative is preferred because a wet pond facility would be capable of fully meeting the requirements for quality control</li></ul>                                                                                                                                                                                                                                                                                                                             |

| Criteria                                           | Alternatives for Pond #51                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                    | Bottom Draw Outlet in Wet Pond                                                                                                                                                                                                                                                                                                                       | Retrofit Outlet to Extend Detention                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Underground Storage Tanks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Alternative Description                            | <ul style="list-style-type: none"> <li>Construct a bottom draw outlet to reduce temperatures of discharged water.</li> <li>Only applicable if the wetland is converted into a wet pond</li> </ul>                                                                                                                                                    | <ul style="list-style-type: none"> <li>Construct upgraded outlet structure to increase the extended detention within existing SWM facility</li> </ul>                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>Installed in municipal owned lands including parks and the watercourse land parcel</li> <li>Underground storage tanks will capture and detain stormwater and release over an extended time period</li> <li>Infiltration type underground tanks will allow for infiltration during detention period</li> <li>May need water quality control prior to infiltrating (if infiltration is proposed)</li> </ul>                                                                                                                                                                                                                                                                                                   |
| Location in Treatment Train                        | End of Pipe                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Target SWM Objective(s)                            | Temperature Control                                                                                                                                                                                                                                                                                                                                  | Erosion Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Erosion and Temperature Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Technical Considerations                           |                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Constructability and accessibility                 | <ul style="list-style-type: none"> <li>Constructability is simple, pending adequate depth of the wet pond</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Greater depth enhances the thermal mitigation function of the bottom draw outlet</li> </ul>                                          | <ul style="list-style-type: none"> <li>Construction is feasible and within municipally owned lands</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Erosion and sediment control plans</li> </ul>                                                                                                                                                                                                                               | <ul style="list-style-type: none"> <li>Footprint may be large and depends on available soil conditions; constructability is moderate</li> <li>Still allows for use of land at-grade, so can be proposed under existing recreational fields</li> <li>Requires re-organization of existing outfalls to feed into central underground tank(s)</li> <li>Based on soil mapping, the soil in the drainage area is conducive to infiltration</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Tanks with infiltration capabilities provide additional benefits for erosion and temperature control</li> <li>Site specific soil testing is required to confirm suitability of infiltration</li> </ul> |
| Ability to meet stormwater management objective(s) | <ul style="list-style-type: none"> <li>Bottom draw outlets can be effective in decreasing the temperature of the outlet water</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Thermal mitigation would be best achieved with a combination of LID methods</li> </ul>                           | <ul style="list-style-type: none"> <li>Provided that adequate volume can be made available, the adjustment of the outlet can be an effective solution to provide the required extended detention</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Retrofit of the outlet would require upgrade of the available storage volume of the facility</li> <li>Erosion control may be facilitated with use of LIDs upstream</li> </ul> | <ul style="list-style-type: none"> <li>Underground tanks, especially with infiltration capabilities, are effective for providing erosion and temperature control</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Longer detention times and depth below grade can enhance the erosion and temperature control, respectively</li> </ul>                                                                                                                                                                                                                                                                                                                                                       |
| Engineering best practises / innovative solution   | <ul style="list-style-type: none"> <li>Bottom draw outlets in combination with cooling trenches are recent best management practices</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Thermal mitigation can be enhanced overall with LIDs within the contributing watershed</li> </ul>         | <ul style="list-style-type: none"> <li>Typically more traditional SWM approach</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Erosion control may be facilitated with use of LIDs upstream</li> </ul>                                                                                                                                                                                                                         | <ul style="list-style-type: none"> <li>Underground tanks, including infiltration, are noted as best management practices</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Maintenance of underground tanks is more extensive than at-grade alternatives</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Summary / Recommendations                          | <ul style="list-style-type: none"> <li>A bottom draw outlet is a recommended outlet alternative for the wet pond to achieve required temperature control</li> </ul>                                                                                                                                                                                  | <ul style="list-style-type: none"> <li>Constructability should be straightforward</li> <li>More supplementary alternatives required to provide adequate quality control</li> </ul>                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Technically feasible, requiring more intrusive maintenance</li> <li>Constructability within existing terrain is moderate and can be incorporated into existing land uses</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Natural Environment                                |                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Impacts to wildlife and vegetation habitats        | <ul style="list-style-type: none"> <li>No impact to vegetation</li> <li>May impact aquatic habitat, although fish not anticipated within facility</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Effects could be mitigated with appropriate screens and outflow velocities</li> </ul>        | <ul style="list-style-type: none"> <li>Some vegetation will likely be cleared for retrofit of the facility outlet;</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Fisheries and migratory bird timing windows will be adhered to if required;</li> <li>Restoration plans will be developed to restore any cleared vegetation</li> </ul>                                                                                       | <ul style="list-style-type: none"> <li>Would require removal of vegetation depending on specific location</li> <li>Once installed, less intrusive than other alternatives because of location below grade</li> <li>May reduce terrestrial habitat</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Restoration plan required if loss of vegetation expected due to construction</li> <li>Migratory bird windows to be adhered to for construction</li> </ul>                                                                                                                                                                                                                                  |
| Impacts / improvements based on SAR / ESA          | <ul style="list-style-type: none"> <li>Cooling effects are very beneficial for the potential Redside Dace habitat downstream</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Alternative can be enhanced with LIDs within the watershed and planting techniques within the wet pond</li> </ul> | <ul style="list-style-type: none"> <li>Opportunities exist for cooling water before discharging downstream via outlet structures</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Can be enhanced with LID measures upstream</li> <li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li> </ul>                                                             | <ul style="list-style-type: none"> <li>Underground tanks may decrease water temperature, providing benefits to the identified SAR</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li> </ul>                                                                                                                                                                                                                                                                                                                                                                              |
| Summary / Recommendations                          | <ul style="list-style-type: none"> <li>Bottom draw outlet is a simple alternative to incorporate into a wet pond for the achievement of temperature control</li> </ul>                                                                                                                                                                               | <ul style="list-style-type: none"> <li>Retrofit of the existing outlet will have a low impact to the natural environment</li> <li>If storage volume can be adequately increased, the retrofit of the outlet can provide required erosion control which will increase water quality</li> </ul>                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>Underground tanks are a long-term non-invasive alternative for providing erosion and temperature control</li> <li>This alternative may be a viable solution to provide erosion and quantity control without disruption to the existing wetland</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Social Impacts                                     |                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Requirement of                                     | N/A                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"> <li>Likely not required; block is relatively large and</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"> <li>Sufficient space is available within municipal</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

|                                                                             | Alternatives for Pond #51                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Criteria                                                                    | Bottom Draw Outlet in Wet Pond                                                                                                                                                                                                                                                                            | Retrofit Outlet to Extend Detention                                                                                                                                                                                                                                                                                                                                                                                                                                        | Underground Storage Tanks                                                                                                                                                                                                                                                                                                                                                                              |
| easements or purchase of private lands                                      |                                                                                                                                                                                                                                                                                                           | accessible<br><b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Land requirements would be confirmed through conceptual design</li> </ul>                                                                                                                                                                                                                                                                                         | lands<br><b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Land requirements would be confirmed through conceptual design</li> </ul>                                                                                                                                                                                                                          |
| Impacts to public and private properties due to construction and operations | <ul style="list-style-type: none"> <li>Impacts are related to the construction of the wet pond</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Bottom draw outlet itself does not present additional impacts</li> </ul>                             | <ul style="list-style-type: none"> <li>Potential noise and visual impacts associated with construction for the residences backing onto wetland / parkland block</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Construction management plan, including restrictions on hours</li> <li>A staging area should be set up within the municipal parkland as to not interfere with traffic or private property</li> </ul> | <ul style="list-style-type: none"> <li>Construction anticipated within wetland and/or park lands; impacts may include temporary, minor traffic and noise issues due to proximity to residential neighbourhood</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Proper signage and safety measures to be set up for construction period</li> </ul> |
| Effect on public safety                                                     | N/A                                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"> <li>Retrofit of the outlet itself has low impact on public safety</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Warning signs and fencing (if required) will provide measures of safety</li> </ul>                                                                                                                                                                              | <ul style="list-style-type: none"> <li>No public safety concerns beyond construction period</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Proper signage and safety measures to be set up for construction period</li> </ul>                                                                                                                   |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"> <li>There are no social impacts associated with the bottom draw outlet</li> </ul>                                                                                                                                                                                      | <ul style="list-style-type: none"> <li>Retrofit of the facility outlet itself is of low impact in regards to noise, traffic and land use</li> <li>Scale of construction is relatively small</li> </ul>                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"> <li>Underground tanks are proposed to be located in public lands, generally not intrusive to the public during or after construction</li> </ul>                                                                                                                                                                                                                     |
| Economic Considerations                                                     |                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                        |
| Capital costs                                                               | <ul style="list-style-type: none"> <li>Low capital cost as standalone item</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>No mitigation required</li> </ul>                                                                                        | <ul style="list-style-type: none"> <li>Low to moderate cost for the retrofit of the outlet itself</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Capital costs can be marginally reduced if the extended detention volume does not increase significantly from existing conditions</li> </ul>                                                                                                                       | <ul style="list-style-type: none"> <li>Moderate to high capital cost related to storage tank infrastructure</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Efficient tank design to minimize capital costs</li> <li>Adequate soils and extend of earthworks will affect capital cost</li> </ul>                                                 |
| Maintenance and operating costs                                             | <ul style="list-style-type: none"> <li>Low maintenance costs as standalone; costs associated with maintenance of wet pond</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Maintenance due to clogging can be reduced with proper screens</li> </ul> | <ul style="list-style-type: none"> <li>Low maintenance cost and frequency; likely seasonally to prevent clogging</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Maintenance frequency should be as directed by operations manual</li> </ul>                                                                                                                                                                         | <ul style="list-style-type: none"> <li>Low maintenance costs associated with cleaning out tanks as per operations manual or in event of clogging</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Can prevent clogging with additional pre-treatment techniques</li> </ul>                                                                        |
| Impact on future development and growth                                     | <ul style="list-style-type: none"> <li>No impacts</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not applicable</li> </ul>                                                                                                                         | <ul style="list-style-type: none"> <li>No impacts</li> <li>Limited to the existing land use; higher imperviousness in the watershed would require a larger extended detention volume and therefore altered outlet structure</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b>                                                                                                                                                                                 | <ul style="list-style-type: none"> <li>No impact, but underground tanks would require expansion if contributing land use was to intensify</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>On-site control requirements for any future intensification within the watershed would mitigate further expansion</li> </ul>                           |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"> <li>Bottom draw outlet is a cost effective alternative to incorporate into wet pond design to meet temperature criteria</li> </ul>                                                                                                                                     | <ul style="list-style-type: none"> <li>Retrofit of the existing outlet to provide the required extended detention is a relatively low cost solution in itself; the corresponding requirement to increase the detention volume will increase the capital cost</li> </ul>                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>Underground tanks can provide reasonable capital and maintenance costs for the achievement of erosion, quantity and temperature control</li> <li>Capital costs can fluctuate based on actual conditions at the specific location chosen at conceptual design</li> </ul>                                                                                         |
| Results of Alternative Evaluation                                           | <ul style="list-style-type: none"> <li>This alternative is preferred because it is a cost effective way to mitigate temperature increasing in the preferred alternative of converting to a wet pond</li> </ul>                                                                                            | <ul style="list-style-type: none"> <li>This alternative is preferred to provide cost-effective erosion control and can be used in conjunction with the other preferred alternatives</li> </ul>                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>This is not a preferred alternative because it is a more costly option and will create more disturbance than retrofitting the existing outlet</li> </ul>                                                                                                                                                                                                        |



| Criteria                                              | Alternatives for Pond #51                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                       | Infiltration in Right-of-Ways (R.O.W.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Bioswales                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Expand Size of Existing Pond                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Alternative Description                               | <ul style="list-style-type: none"><li>Install perforated secondary pipe within existing storm sewer systems to allow for infiltration through linear soakaway pits</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"><li>Construct bioswales within the road right-of-ways within the facility drainage area</li><li>Bioswales to contain native plantings and subdrains</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"><li>Expand the existing SWM facility area in terms of volume to provide for adequate permanent pool, active storage, and extended detention</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                                                       | Conveyance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | End of Pipe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                                                       | Quality, Erosion and Temperature Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Quality and Erosion Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Technical Considerations                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Constructability and accessibility                    | <ul style="list-style-type: none"><li>Construction area is extensive and many secondary infiltration pipes would require to be installed to achieve SWM criteria</li><li>Requires coordination with existing infrastructure and utilities</li><li>Based on soil mapping, the soil in the drainage area is conducive to infiltration</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may be more suited as supplementary water quality / erosion / temperature control measures, where constructability and retrofit are least disruptive to existing infrastructure</li><li>Site specific soil testing is required to confirm suitability of infiltration</li></ul> | <ul style="list-style-type: none"><li>Construction area is extensive and pipe networks are more intricate, requiring coordination with existing infrastructure</li><li>Road right of ways need to be conducive to grading and space criteria for bioswales</li><li>Based on soil mapping, the soil in the drainage area is conducive to infiltration</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Bioswales may be more suited as supplementary water quality / erosion / temperature control measures, where constructability and retrofit are least disruptive to existing infrastructure</li><li>Site specific soil testing is required to confirm suitability of infiltration</li></ul> | <ul style="list-style-type: none"><li>Moderate constructability due to extend of earthworks and infrastructure</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Efficient design and access plans can mitigate negative effects of constructability of the wetland expansion</li></ul>                                                                                                                                                                                                                                                                           |
| Ability to meet stormwater management objective(s)    | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may are more effective when used within a treatment train to achieve the stormwater objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Additional pre-treatment will enhance the function of the perforated pipes, to reduce clogging</li></ul>                                                                                                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"><li>Bioswales are more effective when used within a treatment train to achieve the stormwater objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Additional pre-treatment will enhance the function of bioswales, to reduce clogging of the underdrain pipes</li></ul>                                                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>Expansion of the facility will provide adequate controls to meet the SWM objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Pre-treatment of stormwater with LIDs can reduce the required expansion volume</li><li>Using the maximum safe slopes will decrease the footprint of the expanded wetland</li></ul>                                                                                                                                                                                                    |
| Engineering best practises / innovative solution      | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may are innovative solutions within stormwater management</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Enhanced with further use of LIDs such as vegetated filter strips</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"><li>Bioswales are innovative solutions within stormwater management conveyance systems</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Enhanced with further use of LIDs such as vegetated filter strips</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>Typically more traditional SWM approach</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Can be enhanced with use of LIDs within the contributing watershed</li></ul>                                                                                                                                                                                                                                                                                                                                                      |
| Summary / Recommendations                             | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may are effective as part of a treatment train and where retrofit does not greatly interfere with existing infrastructure</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>Bioswales are effective as part of a treatment train and where retrofit does not greatly interfere with existing infrastructure</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"><li>Constructability generally not an issue; technically feasible</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Natural Environment                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Impacts to wildlife and vegetation habitats           | <ul style="list-style-type: none"><li>May require removal of some vegetation depending on specific location; likely few impacts to existing wildlife and vegetation habitats</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Areas disturbed during construction will be restored</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"><li>May require removal of some vegetation depending on specific location</li><li>May present phosphorus issues if not properly designed and/or maintained</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Planted bioswales will enhance neighbourhoods with additional vegetated areas</li></ul>                                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>Expansion of the existing facility will require earthworks within the existing wetland habitat, therefore interfering with existing wildlife and vegetation</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Fisheries and migratory bird timing windows will be adhered to if required; an ecologist/biologist will be consulted due to proximity to existing watercourse</li><li>Restoration plan should be developed</li><li>Expansion can be designed to best avoid the removal of trees from the pond block</li></ul> |
| Impacts / improvements based on SAR / ESA             | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) may decrease water temperature, providing benefits to the identified SAR</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may be more suited as supplementary water temperature control measures</li></ul>                                                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>Bioswales may decrease water temperature, providing benefits to the identified SAR</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Bioswales may be more suited as supplementary water temperature control measures</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"><li>There are opportunities for cooling water before discharging downstream via inlet/outlet structures and other wetland details</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Thermal mitigation can be provided by inlet/outlet configurations</li><li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li></ul>                                                                                                                                      |
| Summary / Recommendations                             | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits present few impact on the natural environment</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>Bioswales which are properly designed to avoid phosphorus loading provide positive impact on the natural environment</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>With a proper conceptual design, the impact to natural environment is not high; removal of sediment from downstream waters is beneficial to aquatic species</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                         |
| Social Impacts                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Requirement of easements or purchase of private lands | <ul style="list-style-type: none"><li>To be constructed within municipal R.O.W.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"><li>To be constructed within municipal R.O.W.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"><li>Acquisition of private lands not required for this site</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Land requirements would be confirmed through conceptual design</li></ul>                                                                                                                                                                                                                                                                                                                                          |

| Criteria                                                                    | Alternatives for Pond #51                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-----------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                             | Infiltration in Right-of-Ways (R.O.W.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Bioswales                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Expand Size of Existing Pond                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Impacts to public and private properties due to construction and operations | <ul style="list-style-type: none"><li>Impacts may include temporary, minor traffic and noise issues due to construction within the residential streets</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Appropriate construction and traffic management schedule to be adhered to</li></ul>                                                                                                                                                                           | <ul style="list-style-type: none"><li>Impacts may include temporary, minor traffic and noise issues due to construction within the residential streets</li><li>Bioswales are likely to face public opposition due to the maintenance requirements, visual disruption to an otherwise “clean” front lawn and inconvenience of culverts under driveways</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Appropriate construction and traffic management schedule to be adhered to</li></ul> | <ul style="list-style-type: none"><li>Noise and visual impacts associated with construction for the residences backing onto wetland block</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Construction management plan, including restrictions on hours</li><li>A staging area should be set up within the municipal parkland as to not interfere with traffic or private property</li></ul> |
| Effect on public safety                                                     | <ul style="list-style-type: none"><li>No public safety concerns beyond construction period</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Proper signage and safety measures to be set up for construction period</li></ul>                                                                                                                                                                                                                                         | <ul style="list-style-type: none"><li>No public safety concerns beyond construction period</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Proper signage and safety measures to be set up for construction period</li></ul>                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"><li>Conversion to wet pond may appear as a safety hazard since deeper water found within recreational area and trails</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Adequate slopes, warning signs, and fencing (if required) will provide measures of safety, all as per the required criteria</li></ul>                                                |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>Impacts are minor and mostly temporary, within the construction period</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"><li>Impacts during construction are temporary and mostly minor</li><li>Long term impacts on residents due to visual impacts and culvert maintenance may be significant</li></ul>                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"><li>Expansion of the wetland to a wet pond would be a longer-term construction project with potential noise, traffic and visual impacts</li><li>Overall, impact not significant due to setback from residential homes and safety measures used throughout construction</li></ul>                                                                                                                               |
| Economic Considerations                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Capital costs                                                               | <ul style="list-style-type: none"><li>Moderate to high capital cost related to new pipe infrastructure, earthworks and plantings, as well as likely relocation of existing pipe infrastructure</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Proficient SUE investigation prior to design work can minimize unexpected existing pipe/utility interferences</li></ul>                                                                                               | <ul style="list-style-type: none"><li>Moderate to high capital cost related to new pipe infrastructure, earthworks and plantings, as well as likely relocation of existing pipe infrastructure</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Proficient SUE investigation prior to design work can minimize unexpected existing pipe/utility interferences</li></ul>                                                                                                                    | <ul style="list-style-type: none"><li>Moderate to high capital cost for earthworks, grading, infrastructure components, permits</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Capital costs can be marginally reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required detention volumes)</li></ul>                                             |
| Maintenance and operating costs                                             | <ul style="list-style-type: none"><li>Moderate maintenance costs associated with unclogging perforated pipes</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Pre-treatment of stormwater with grassed filter strips can prevent some clogging of perforated pipes</li></ul>                                                                                                                                                                                          | <ul style="list-style-type: none"><li>Low to moderate maintenance costs associated with replacing filter media, unclogging perforated pipes</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Pre-treatment of stormwater with grassed filter strips can prevent some clogging of perforated pipes</li></ul>                                                                                                                                                                                | <ul style="list-style-type: none"><li>Moderate maintenance cost and frequency; likely seasonally</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Maintenance frequency should be as directed by operations manual</li></ul>                                                                                                                                                                  |
| Impact on future development and growth                                     | <ul style="list-style-type: none"><li>Retrofit R.O.W. with perforated pipes and soakaway pits may dictate R.O.W. standards for future development</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>On-site control requirements for any future intensification within the watershed would mitigate negative impacts on the LID</li></ul>                                                                                                                              | <ul style="list-style-type: none"><li>Retrofit R.O.W. with bioswales may dictate R.O.W. standards for future development</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Bioswales can enhance the aesthetic appeal of a neighbourhood / development and provide an ‘added value’</li><li>On-site control requirements for any future intensification within the watershed would mitigate negative impacts on the LID</li></ul>                                                           | <ul style="list-style-type: none"><li>Design would limit land use to existing conditions; any proposed intensification within the watershed would likely require on-site controls</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>On-site control requirements for any intensified development within the pond’s watershed</li></ul>                                                         |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>Perforated pipes and soakaway pits are a moderate to high capital cost for retrofit and require moderately complex maintenance</li></ul>                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>Bioswales are a moderate to high capital cost for retrofit but may add value to a neighbourhood, depending on general public opinion</li></ul>                                                                                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"><li>Expansion of the wetland to a wet pond would present high capital costs for achievement of all the SWM criteria</li></ul>                                                                                                                                                                                                                                                                                  |
| Results of Alternative Evaluation                                           | <ul style="list-style-type: none"><li>This alternative is not preferred because infiltration in R.O.W.s cannot provide the required level of water quality and erosion control.</li><li>Another alternative would need to be implemented in conjunction with infiltration in R.O.W.s in order to meet SWM objectives, making this alternative economically inefficient.</li><li>The construction of infiltration pipes in R.O.W.s will create short term accessibility, visual and noise impacts on residents.</li></ul> | <ul style="list-style-type: none"><li>This alternative is not preferred because bioswales cannot provide the required level of water quality and erosion control.</li><li>Another alternative would need to be implemented in conjunction with bioswales in order to meet SWM objectives, making this alternative economically inefficient.</li><li>The construction and maintenance of bioswales will create short and long term accessibility and visual impacts on residents.</li></ul>                                                    | <ul style="list-style-type: none"><li>This alternative is a preferred option because it would be done in conjunction with the other preferred alternatives to achieve all of the SWM criteria</li></ul>                                                                                                                                                                                                                                          |

| Criteria                                              | Alternatives for Pond #51                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                       | Cooling Trench                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Aquatic and Riparian Plantings at Facility                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Construct Forebay                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Alternative Description                               | <ul style="list-style-type: none"><li>Excavation of a trench between the pond control structure maintenance hole and the outlet</li><li>Modification of outlet piping infrastructure to discharge into trench</li><li>Installation of stone material and restoration of ground surface</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>Plantings to increase density and area of vegetation cover surrounding facility and within facility to provide shade for cooling of detained water</li></ul>                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"><li>Earthworks for construction of berm and increased forebay depth</li><li>Downstream section of facility will remain as existing and outlet will not be affected</li></ul>                                                                                                                                                                                                                                                                                                                                                        |
| Location in Treatment Train                           | End of Pipe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Target SWM Objective(s)                               | Temperature Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Quality Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Technical Considerations                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Constructability and accessibility                    | <ul style="list-style-type: none"><li>Feasible construction and accessibility is adequate</li><li>Construction footprint is relatively small</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Erosion and sediment control plans required</li></ul>                                                                                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"><li>No constructability issues anticipated with adding plantings to proposed facilities</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Plantings enhance temperature control by providing shade</li></ul>                                                                                                                                                                                                     | <ul style="list-style-type: none"><li>Moderate constructability due to extend of earthworks and infrastructure</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Efficient design and access plans can mitigate negative effects of constructability of the wetland expansion</li></ul>                                                                                                                                                                                                                             |
| Ability to meet stormwater management objective(s)    | <ul style="list-style-type: none"><li>Cooling trenches can be effective in decreasing the temperature of the outlet water</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Thermal mitigation would be best achieved with a combination of LID methods</li></ul>                                                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>Shade from plantings will reduce the temperature of stormwater at a facility</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Plantings are better used in conjunction with other cooling methods to achieve adequate temperature control</li></ul>                                                                                                                                                         | <ul style="list-style-type: none"><li>Forebay could provide water quality control; additional measures required for thermal mitigation and erosion control</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Forebay function could be enhanced with implementation of LIDs throughout watershed</li><li>Forebay water temperature can be cooled through planting techniques</li></ul>                                                                                                                              |
| Engineering best practises / innovative solution      | <ul style="list-style-type: none"><li>Cooling trenches are a recent best management practice</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Thermal mitigation can be enhanced overall with LIDs within the contributing watershed</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"><li>Temperature control of stormwater in general is becoming an engineering best management practice in areas with sensitive habitats</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Effects of plantings can be enhanced with other methods such as use of a bottom draw outlet</li></ul>                                                                                                                    | <ul style="list-style-type: none"><li>Typically more traditional SWM approach</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <p>Forebay function can be enhanced with LIDs</p>                                                                                                                                                                                                                                                                                                                                                                         |
| Summary / Recommendations                             | <ul style="list-style-type: none"><li>Technically feasible with a small construction footprint</li><li>A cooling trench would help with mitigating the temperature impacts of the SWM pond</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"><li>Plantings at stormwater management facility are a simple alternative to provide additional temperature controls</li></ul>                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>Construction of a forebay can meet SWM criteria within a lesser footprint than a full wet pond; requires additional erosion controls</li><li>Quantity control would still be outstanding without additional retrofit</li></ul>                                                                                                                                                                                                                                                                                                  |
| Natural Environment                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Impacts to wildlife and vegetation habitats           | <ul style="list-style-type: none"><li>Existing vegetation in the work area will be cleared</li><li>All affected areas will be restored</li><li>Results in a net neutral effect to terrestrial habitat</li><li>Reduction of temperature released into the downstream cool-water watercourse will improve the native aquatic habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Appropriate erosion and sediment control measures will be undertaken during construction to reduce any negative impacts to the downstream watercourse</li><li>Restoration plans will be developed for surrounding areas impacted by construction</li></ul> | <ul style="list-style-type: none"><li>Planting native species can enhance the existing wildlife and vegetation</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul>                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>Construction of a forebay will require earthworks partially within the existing wetland habitat, therefore interfering with existing wildlife and vegetation</li><li>The removal of some trees may be required</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Fisheries and migratory bird timing windows will be adhered to if required; an ecologist/biologist will be consulted</li><li>Restoration plans will be developed to restore any cleared vegetation</li></ul> |
| Impacts / improvements based on SAR / ESA             | <ul style="list-style-type: none"><li>There are opportunities to improve the habitat quality of the receiving watercourse by reducing the temperature of flows entering the watercourse</li><li>Cooling effects are very beneficial for Redside Dace habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li></ul>                                                                                                                                                                                                     | <ul style="list-style-type: none"><li>Providing additional shade at stormwater facilities reduces stormwater temperature which is a key benefit for SAR habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Effects of plantings can be enhanced with other methods such as use of a bottom draw outlet</li><li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li></ul> | <ul style="list-style-type: none"><li>There are opportunities for cooling water before discharging downstream via inlet structures and planting techniques</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Thermal mitigation may be improved with the construction of a forebay</li><li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li></ul>                                                                                             |
| Summary / Recommendations                             | <ul style="list-style-type: none"><li>A cooling trench at the pond outlet is a relatively simple alternative to mitigate temperatures impacts of the wet pond for the achievement of temperature control</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>Plantings at stormwater facilities provide positive impacts on the natural environment (provided they are non-invasive species)</li></ul>                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>A forebay can be beneficial to downstream receiving waters but will alter any existing habitat within the construction area</li></ul>                                                                                                                                                                                                                                                                                                                                                                                           |
| Social Impacts                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Requirement of easements or purchase of private lands | <ul style="list-style-type: none"><li>Sufficient space is available within the pond block</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"><li>Not applicable (unless required in conjunction with stormwater facility construction)</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                                                                                                                                                                                                                             | <ul style="list-style-type: none"><li>Sufficient space is available within the pond block</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                                                                                                                                                                                                                                                                                                                                |

| Criteria                                                                    | Alternatives for Pond #51                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                             | Cooling Trench                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Aquatic and Riparian Plantings at Facility                                                                                                                                                                                                                                                 | Construct Forebay                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Impacts to public and private properties due to construction and operations | <ul style="list-style-type: none"><li>Noise and visual impacts associated with construction for the residences backing onto proposed SWM facility block</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Construction management plan, including restrictions on hours may reduce inconveniences associated with construction</li></ul>                                                                                   | <ul style="list-style-type: none"><li>No impacts to public</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                                                                                    | <ul style="list-style-type: none"><li>Noise and visual impacts associated with construction for the residences backing onto wetland block</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Construction management plan, including restrictions on hours</li><li>A staging area should be set up within the municipal parkland as to not interfere with traffic or private property</li></ul> |
| Effect on public safety                                                     | <ul style="list-style-type: none"><li>The cooling trench will not have any affects on public safety once constructed</li><li>During construction there is a potential safety risk due to excavation if a member of the public was to enter the site</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>The construction site should be secured during and after construction hours with warning signs and fencing</li></ul> | <ul style="list-style-type: none"><li>Vegetation should be suitable for proposed facility and clearly indicate any water’s edge</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Vegetation at facilities must be maintained</li></ul>  | <ul style="list-style-type: none"><li>By building to the required slope and depth criteria, the forebay should not pose a threat to public safety</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Adequate slopes, warning signs, and fencing (if required) will provide measures of safety</li></ul>                                                                                        |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>No long term social impacts associated with the cooling trench</li><li>Minimal disturbance to the public may occur during construction but the construction time frame will be brief</li></ul>                                                                                                                                                                                                                                         | <ul style="list-style-type: none"><li>No significant social impacts of plantings at stormwater facilities</li></ul>                                                                                                                                                                        | <ul style="list-style-type: none"><li>Expansion of the wetland include forebay is a longer-term construction project with potential noise, traffic and visual impacts</li><li>Overall, impact not significant due to setback from residential homes and safety measures used throughout construction</li></ul>                                                                                                                                   |
| Economic Considerations                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Capital costs                                                               | <ul style="list-style-type: none"><li>Low capital cost for a relatively small excavation and materials</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Capital costs can be marginally reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required trench volume)</li></ul>                                                                                                      | <ul style="list-style-type: none"><li>Low capital cost relative to other alternatives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Costs may vary depending on extents and types of plantings</li></ul>                             | <ul style="list-style-type: none"><li>Moderate capital cost for earthworks, grading, infrastructure components, permits</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Capital costs can be marginally reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required volumes)</li></ul>                                                               |
| Maintenance and operating costs                                             | <ul style="list-style-type: none"><li>Low maintenance cost associated with cleaning out the trench</li><li>Lower maintenance frequency; likely once per year</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Maintenance frequency should be as directed by operations manual</li></ul>                                                                                                                                  | <ul style="list-style-type: none"><li>Low maintenance costs with native, sustainable plantings</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Lower maintenance plants will minimize costs of maintenance and/or replanting</li></ul> | <ul style="list-style-type: none"><li>Moderate maintenance cost and frequency; likely seasonally</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Maintenance frequency should be as directed by operations manual</li></ul>                                                                                                                                                                  |
| Impact on future development and growth                                     | <ul style="list-style-type: none"><li>No impacts</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>No impact on future development</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                                                                         | <ul style="list-style-type: none"><li>Design would limit land use to existing conditions; any proposed intensification within the watershed would likely require on-site controls</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>On-site control requirements for any intensified development within the pond’s watershed</li></ul>                                                         |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>A cooling trench is a cost effective alternative to meet temperature criteria</li></ul>                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>Plantings at SWM facilities are a low cost alternative for providing temperature control</li></ul>                                                                                                                                                   | <ul style="list-style-type: none"><li>Expansion of the wetland to include a forebay would present higher capital costs for achievement of all the SWM criteria</li></ul>                                                                                                                                                                                                                                                                         |
| Results of Alternative Evaluation                                           | <ul style="list-style-type: none"><li>This alternative is not preferred because other preferred alternatives adequately provide erosion control and require less maintenance while providing other benefits (such as environmental benefits)</li></ul>                                                                                                                                                                                                                       | <ul style="list-style-type: none"><li>This alternative is preferred because it will improve/maintain existing habitat and vegetation</li><li>This alternative provides temperature control at a relatively low capital cost.</li></ul>                                                     | <ul style="list-style-type: none"><li>This alternative is a preferred option because it would be done in conjunction with the other preferred alternatives to achieve all of the SWM criteria</li></ul>                                                                                                                                                                                                                                          |



| Table 1 –Evaluation of Conceptual Design Alternatives for Pond #55 (Offline Wet Pond) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Criteria                                                                              | Alternatives for Pond #55                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                                                                                       | Do Nothing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Retrofit Outlet to Extend Detention                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Underground Storage Tanks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Alternative Description                                                               | <ul style="list-style-type: none"> <li>The pond will continue to function as existing</li> <li>Pond #55 is a wet pond that was built to provide flood control, with a 5.01 ha minor drainage area and a 5.9 ha major drainage area.</li> </ul>                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>Construct upgraded outlet structure to increase the extended detention within existing SWM facility</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>Installed in municipal owned lands including parks and the watercourse land parcel</li> <li>Underground storage tanks will capture and detain stormwater and release over an extended time period</li> <li>Infiltration type underground tanks will allow for infiltration during detention period</li> <li>May need water quality control prior to infiltrating (if infiltration is proposed)</li> </ul>                                                                                                                                                                                                                                                                                                   |
| Location in Treatment Train                                                           | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | End of Pipe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Target SWM Objective(s)                                                               | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Erosion Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Erosion and Temperature Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Technical Considerations                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Constructability and accessibility                                                    | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>Construction is within municipally owned lands</li> <li>Associated works involving expanding the facility volume may present constructability issues</li> <li>Negative impacts from construction disturbance will outweigh the minimal erosion control</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Erosion and sediment control plans</li> </ul>                                                                                            | <ul style="list-style-type: none"> <li>Footprint may be large and depends on available soil conditions; constructability is moderate</li> <li>Still allows for use of land at-grade, so can be proposed under existing recreational fields</li> <li>Requires re-organization of existing outfalls to feed into central underground tank(s)</li> <li>Based on soil mapping, the soil in the drainage area is conducive to infiltration</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Tanks with infiltration capabilities provide additional benefits for erosion and temperature control</li> <li>Site specific soil testing is required to confirm suitability of infiltration</li> </ul> |
| Ability to meet stormwater management objective(s)                                    | <ul style="list-style-type: none"> <li>Does not provide for or meet the stormwater management objectives of the City and/or TRCA, for erosion control</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>No mitigation undertaken</li> </ul>                                                                                                                                                                                                            | <ul style="list-style-type: none"> <li>Provided that adequate volume can be made available, the adjustment of the outlet can be an effective solution to provide the required extended detention</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Retrofit of the outlet would require upgrade of the available storage volume of the facility</li> <li>Erosion control may be facilitated with use of LIDs upstream</li> </ul>                                                         | <ul style="list-style-type: none"> <li>Underground tanks, especially with infiltration capabilities, are effective for providing erosion and temperature control</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Longer detention times and depth below grade can enhance the erosion and temperature control, respectively</li> </ul>                                                                                                                                                                                                                                                                                                                                                       |
| Engineering best practises / Innovative solution                                      | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>Typically more traditional SWM approach</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Erosion control may be facilitated with use of LIDs upstream</li> </ul>                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"> <li>Underground tanks, including infiltration, are noted as best management practices</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Maintenance of underground tanks is more extensive than at-grade alternatives</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Summary / Recommendations                                                             | <ul style="list-style-type: none"> <li>Does not provide for or meet the stormwater management objectives of the City and/or TRCA, for erosion control</li> </ul>                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"> <li>Constructability is technically feasible</li> <li>Impacts from construction outweighs minimal erosion control</li> <li>More supplementary alternatives required to provide adequate erosion control</li> </ul>                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>Technically feasible, requiring more intrusive maintenance</li> <li>Constructability within existing terrain is moderate and can be incorporated into existing land uses</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Natural Environment                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Impacts to wildlife and vegetation habitats                                           | <ul style="list-style-type: none"> <li>The current condition of wildlife and vegetation habitats will not change; however if the lack of erosion control causes future erosion in the receiving watercourse or future increase of temperature in the watercourse, this could have a negative impact on the future condition of wildlife and vegetation habitats.</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>No mitigation undertaken</li> </ul> | <ul style="list-style-type: none"> <li>Some vegetation will likely be cleared for retrofit of the facility outlet;</li> <li>Impacts from construction may outweigh minimal erosion control feasible</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Fisheries and migratory bird timing windows will be adhered to if required;</li> <li>Restoration plans will be developed to restore any cleared vegetation</li> <li>May be able to be designed to retain existing trees</li> </ul> | <ul style="list-style-type: none"> <li>Would require removal of vegetation depending on specific location</li> <li>Once installed, less intrusive than other alternatives because of location below grade</li> <li>May reduce terrestrial habitat</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Restoration plan required if loss of vegetation expected due to construction</li> <li>Migratory bird windows to be adhered to for construction</li> </ul>                                                                                                                                                                                                                                  |
| Impacts / Improvements based on SAR / ESA                                             | <ul style="list-style-type: none"> <li>Existing vegetation provides some benefit to reducing water temperature</li> <li>By not implementing temperature controls, receiving waters may have higher temperatures over time and this can negatively impact sensitive species such as Redside Dace</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>No mitigation undertaken</li> </ul>                                                                  | <ul style="list-style-type: none"> <li>Opportunities exist for cooling water before discharging downstream via outlet structures</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Can be enhanced with LID measures upstream</li> <li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li> </ul>                                                                                                                     | <ul style="list-style-type: none"> <li>Underground tanks may decrease water temperature, providing benefits to the identified SAR</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li> </ul>                                                                                                                                                                                                                                                                                                                                                                              |
| Summary / Recommendations                                                             | <ul style="list-style-type: none"> <li>Existing wetland and terrestrial vegetation in the pond block provide habitat area and will remain in the current condition</li> </ul>                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"> <li>Retrofit of the existing outlet will have a low impact to the natural environment</li> <li>If storage volume can be adequately increased, the retrofit of the outlet can provide required erosion control</li> </ul>                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"> <li>Underground tanks are a long-term non-invasive alternative for providing erosion and temperature control</li> <li>This alternative may be a viable solution to provide erosion and quantity control without disruption to the existing wetland</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

|                                                                             | Alternatives for Pond #55                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Criteria                                                                    | Do Nothing                                                                                                                                                                                                                            | Retrofit Outlet to Extend Detention                                                                                                                                                                                                                                                                                                                                                                                                                                        | Underground Storage Tanks                                                                                                                                                                                                                                                                                                                                                                              |
| Social Impacts                                                              |                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                        |
| Requirement of easements or purchase of private lands                       | N/A                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Likely not required; block is relatively large and accessible</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Land requirements would be confirmed through conceptual design</li> </ul>                                                                                                                                                                                       | <ul style="list-style-type: none"> <li>Sufficient space is available within municipal lands</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Space may be an issue pending adequate soil conditions in which to build</li> </ul>                                                                                                                  |
| Impacts to public and private properties due to construction and operations | N/A                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Potential noise and visual impacts associated with construction for the residences backing onto wetland / parkland block</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Construction management plan, including restrictions on hours</li> <li>A staging area should be set up within the municipal parkland as to not interfere with traffic or private property</li> </ul> | <ul style="list-style-type: none"> <li>Construction anticipated within wetland and/or park lands; impacts may include temporary, minor traffic and noise issues due to proximity to residential neighbourhood</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Proper signage and safety measures to be set up for construction period</li> </ul> |
| Effect on public safety                                                     | N/A                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Retrofit of the outlet itself has low impact on public safety</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Warning signs and fencing (if required) will provide measures of safety</li> </ul>                                                                                                                                                                              | <ul style="list-style-type: none"> <li>No public safety concerns beyond construction period</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Proper signage and safety measures to be set up for construction period</li> </ul>                                                                                                                   |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"> <li>The ‘Do Nothing’ alternative has no social impacts</li> </ul>                                                                                                                                  | <ul style="list-style-type: none"> <li>Retrofit of the facility outlet itself is of low impact in regards to noise, traffic and land use</li> <li>Scale of construction is relatively small</li> </ul>                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"> <li>Underground tanks are proposed to be located in public lands, generally not intrusive to the public during or after construction</li> </ul>                                                                                                                                                                                                                     |
| Economic Considerations                                                     |                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                        |
| Capital costs                                                               | <ul style="list-style-type: none"> <li>No action may result in greater capital expenses in the future</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not applicable</li> </ul> | <ul style="list-style-type: none"> <li>Low to moderate cost for the retrofit of the outlet itself</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Capital costs can be marginally reduced if the extended detention volume does not increase significantly from existing conditions</li> </ul>                                                                                                                       | <ul style="list-style-type: none"> <li>Moderate to high capital cost related to storage tank infrastructure</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Efficient tank design to minimize capital costs</li> <li>Adequate soils and extend of earthworks will affect capital cost</li> </ul>                                                 |
| Maintenance and operating costs                                             | N/A                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Low maintenance cost and frequency; likely seasonally to prevent clogging</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Maintenance frequency should be as directed by operations manual</li> </ul>                                                                                                                                                                         | <ul style="list-style-type: none"> <li>Low maintenance costs associated with cleaning out tanks as per operations manual or in event of clogging</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Can prevent clogging with additional pre-treatment techniques</li> </ul>                                                                        |
| Impact on future development and growth                                     | N/A                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>No impacts</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Limited to the existing land use; higher imperviousness in the watershed would require a larger extended detention volume and therefore altered outlet structure</li> </ul>                                                                                                                                        | <ul style="list-style-type: none"> <li>No impact, but underground tanks would require expansion if contributing land use was to intensify</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>On-site control requirements for any future intensification within the watershed would mitigate further expansion</li> </ul>                           |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"> <li>‘Do nothing’ may postpone required works and increase future costs</li> </ul>                                                                                                                  | <ul style="list-style-type: none"> <li>Retrofit of the existing outlet to provide the required extended detention is a relatively low cost solution in itself; the corresponding requirement to increase the detention volume will increase the capital cost</li> </ul>                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>Underground tanks can provide reasonable capital and maintenance costs for the achievement of erosion, quantity and temperature control</li> <li>Capital costs can fluctuate based on actual conditions at the specific location chosen at conceptual design</li> </ul>                                                                                         |
| Results of Alternative Evaluation                                           | <ul style="list-style-type: none"> <li>This alternative is not preferred because the alternative does not meet the stormwater management objectives</li> </ul>                                                                        | <ul style="list-style-type: none"> <li>This alternative is not preferred because the negative impacts from construction outweigh the minimum erosion control</li> </ul>                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>This is not preferred alternative because it is a more costly option and will create more disturbance than retrofitting the existing outlet</li> </ul>                                                                                                                                                                                                          |

| Criteria                                              | Alternatives for Pond #55                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                       | Bottom Draw Outlet in Wet Pond                                                                                                                                                                                                                                                                                                                   | Cooling Trench                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Expand Size of Existing Pond                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Alternative Description                               | <ul style="list-style-type: none"><li>Construct a bottom draw outlet to reduce temperatures of discharged water.</li><li>Only applicable if the wetland is converted into a wet pond</li></ul>                                                                                                                                                   | <ul style="list-style-type: none"><li>Excavation of a trench between the pond control structure maintenance hole and the outlet</li><li>Modification of outlet piping infrastructure to discharge into trench</li><li>Installation of stone material and restoration of ground surface</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>Expand the existing SWM facility area in terms of volume to provide for adequate permanent pool, active storage, and extended detention</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Location in Treatment Train                           | End of Pipe                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Target SWM Objective(s)                               | Temperature Control                                                                                                                                                                                                                                                                                                                              | Temperature Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Erosion Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Technical Considerations                              |                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Constructability and accessibility                    | <ul style="list-style-type: none"><li>Constructability is simple, pending adequate depth of the wet pond</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Greater depth enhances the thermal mitigation function of the bottom draw outlet</li></ul>                                          | <ul style="list-style-type: none"><li>Feasible construction and accessibility is adequate</li><li>Construction footprint is relatively small</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Erosion and sediment control plans required</li></ul>                                                                                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"><li>Moderate constructability due to extend of earthworks and infrastructure</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Efficient design and access plans can mitigate negative effects of constructability of the wetland expansion</li></ul>                                                                                                                                                                                                                                                                           |
| Ability to meet stormwater management objective(s)    | <ul style="list-style-type: none"><li>Bottom draw outlets can be effective in decreasing the temperature of the outlet water</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Thermal mitigation would be best achieved with a combination of LID methods</li></ul>                           | <ul style="list-style-type: none"><li>Cooling trenches can be effective in decreasing the temperature of the outlet water</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Thermal mitigation would be best achieved with a combination of LID methods</li></ul>                                                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>Expansion of the facility will provide adequate controls to meet the SWM objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Pre-treatment of stormwater with LIDs can reduce the required expansion volume</li><li>Using the maximum safe slopes will decrease the footprint of the expanded wetland</li></ul>                                                                                                                                                                                                    |
| Engineering best practises / innovative solution      | <ul style="list-style-type: none"><li>Bottom draw outlets in combination with cooling trenches are recent best management practices</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Thermal mitigation can be enhanced overall with LIDs within the contributing watershed</li></ul>         | <ul style="list-style-type: none"><li>Cooling trenches are a recent best management practice</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Thermal mitigation can be enhanced overall with LIDs within the contributing watershed</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"><li>Typically more traditional SWM approach</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Can be enhanced with use of LIDs within the contributing watershed</li></ul>                                                                                                                                                                                                                                                                                                                                                      |
| Summary / Recommendations                             | <ul style="list-style-type: none"><li>A bottom draw outlet is a recommended outlet alternative for the wet pond to achieve required temperature control</li></ul>                                                                                                                                                                                | <ul style="list-style-type: none"><li>Technically feasible with a small construction footprint</li><li>A cooling trench would help with mitigating the temperature impacts of the SWM pond</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"><li>Constructability generally not an issue; technically feasible</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Natural Environment                                   |                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Impacts to wildlife and vegetation habitats           | <ul style="list-style-type: none"><li>No impact to vegetation</li><li>May impact aquatic habitat, although fish not anticipated within facility</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Effects could be mitigated with appropriate screens and outflow velocities</li></ul>         | <ul style="list-style-type: none"><li>Existing vegetation in the work area will be cleared</li><li>All affected areas will be restored</li><li>Results in a net neutral effect to terrestrial habitat</li><li>Reduction of temperature released into the downstream cool-water watercourse will improve the native aquatic habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Appropriate erosion and sediment control measures will be undertaken during construction to reduce any negative impacts to the downstream watercourse</li><li>Restoration plans will be developed for surrounding areas impacted by construction</li></ul> | <ul style="list-style-type: none"><li>Expansion of the existing facility will require earthworks within the existing wetland habitat, therefore interfering with existing wildlife and vegetation</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Fisheries and migratory bird timing windows will be adhered to if required; an ecologist/biologist will be consulted due to proximity to existing watercourse</li><li>Restoration plan should be developed</li><li>Expansion can be designed to best avoid the removal of trees from the pond block</li></ul> |
| Impacts / improvements based on SAR / ESA             | <ul style="list-style-type: none"><li>Cooling effects are very beneficial for the potential Redside Dace habitat downstream</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Alternative can be enhanced with LIDs within the watershed and planting techniques within the wet pond</li></ul> | <ul style="list-style-type: none"><li>There are opportunities to improve the habitat quality of the receiving watercourse by reducing the temperature of flows entering the watercourse</li><li>Cooling effects are very beneficial for Redside Dace habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li></ul>                                                                                                                                                                                                     | <ul style="list-style-type: none"><li>There are opportunities for cooling water before discharging downstream via inlet/outlet structures and other wetland details</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Thermal mitigation can be provided by inlet/outlet configurations</li><li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li></ul>                                                                                                                                      |
| Summary / Recommendations                             | <ul style="list-style-type: none"><li>Bottom draw outlet is a simple alternative to incorporate into a wet pond for the achievement of temperature control</li></ul>                                                                                                                                                                             | <ul style="list-style-type: none"><li>A cooling trench at the pond outlet is a relatively simple alternative to mitigate temperatures impacts of the wet pond for the achievement of temperature control</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>With a proper detailed design, the impact to natural environment is not high; removal of sediment from downstream waters is beneficial to aquatic species</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                           |
| Social Impacts                                        |                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Requirement of easements or purchase of private lands | <ul style="list-style-type: none"><li>Not applicable</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                                                                                                                                                | <ul style="list-style-type: none"><li>Sufficient space is available within the pond block</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"><li>Acquisition of private lands not required for this site</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Land requirements would be confirmed through conceptual design</li></ul>                                                                                                                                                                                                                                                                                                                                          |
| Impacts to public and private properties due to       | <ul style="list-style-type: none"><li>Impacts are related to the construction of the wet pond</li></ul> <b>Mitigation/Compensation/Enhancement</b>                                                                                                                                                                                               | <ul style="list-style-type: none"><li>Noise and visual impacts associated with construction for the residences backing onto proposed SWM facility block</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"><li>Noise and visual impacts associated with construction for the residences backing onto wetland block</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

| Criteria                                | Alternatives for Pond #55                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                          |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                         | Bottom Draw Outlet in Wet Pond                                                                                                                                                                                                                                                                            | Cooling Trench                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Expand Size of Existing Pond                                                                                                                                                                                                                                                                                                                                                                             |
| construction and operations             | <b>Measures</b> <ul style="list-style-type: none"><li>▪ Bottom draw outlet itself does not present additional impacts</li></ul>                                                                                                                                                                           | <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Construction management plan, including restrictions on hours may reduce inconveniences associated with construction</li></ul>                                                                                                                                                                                                                                                         | <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Construction management plan, including restrictions on hours</li><li>▪ A staging area should be set up within the municipal parkland as to not interfere with traffic or private property</li></ul>                                                                                                         |
| Effect on public safety                 | <ul style="list-style-type: none"><li>▪ Not applicable</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Not applicable</li></ul>                                                                                                                     | <ul style="list-style-type: none"><li>▪ The cooling trench will not have any affects on public safety once constructed</li><li>▪ During construction there is a potential safety risk due to excavation if a member of the public was to enter the site</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ The construction site should be secured during and after construction hours with warning signs and fencing</li></ul> | <ul style="list-style-type: none"><li>▪ Conversion to wet pond may appear as a safety hazard since deeper water found within recreational area and trails</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Adequate slopes, warning signs, and fencing (if required) will provide measures of safety, all as per the required criteria</li></ul>    |
| Summary / Recommendations               | <ul style="list-style-type: none"><li>▪ There are no social impacts associated with the bottom draw outlet</li></ul>                                                                                                                                                                                      | <ul style="list-style-type: none"><li>▪ No long term social impacts associated with the cooling trench</li><li>▪ Minimal disturbance to the public may occur during construction but the construction time frame will be brief</li></ul>                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>▪ Expansion of the wetland to a wet pond would be a longer-term construction project with potential noise, traffic and visual impacts</li><li>▪ Overall, impact not significant due to setback from residential homes and safety measures used throughout construction</li></ul>                                                                                   |
| Economic Considerations                 |                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                          |
| Capital costs                           | <ul style="list-style-type: none"><li>▪ Low capital cost as standalone item</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ No mitigation required</li></ul>                                                                                        | <ul style="list-style-type: none"><li>▪ Low capital cost for a relatively small excavation and materials</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Capital costs can be marginally reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required trench volume)</li></ul>                                                                                                        | <ul style="list-style-type: none"><li>▪ Moderate to high capital cost for earthworks, grading, infrastructure components, permits</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Capital costs can be marginally reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required detention volumes)</li></ul> |
| Maintenance and operating costs         | <ul style="list-style-type: none"><li>▪ Low maintenance costs as standalone; costs associated with maintenance of wet pond</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Maintenance due to clogging can be reduced with proper screens</li></ul> | <ul style="list-style-type: none"><li>▪ Low maintenance cost associated with cleaning out the trench</li><li>▪ Lower maintenance frequency; likely once per year</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Maintenance frequency should be as directed by operations manual</li></ul>                                                                                                                                  | <ul style="list-style-type: none"><li>▪ Moderate maintenance cost and frequency; likely seasonally</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Maintenance frequency should be as directed by operations manual</li></ul>                                                                                                                      |
| Impact on future development and growth | <ul style="list-style-type: none"><li>▪ No impacts</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Not applicable</li></ul>                                                                                                                         | <ul style="list-style-type: none"><li>▪ No impacts</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Not applicable</li></ul>                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>▪ Design would limit land use to existing conditions; any proposed intensification within the watershed would likely require on-site controls</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ On-site control requirements for any intensified development within the pond’s watershed</li></ul>             |
| Summary / Recommendations               | <ul style="list-style-type: none"><li>▪ Bottom draw outlet is a cost effective alternative to incorporate into wet pond design to meet temperature criteria</li></ul>                                                                                                                                     | <ul style="list-style-type: none"><li>▪ A cooling trench is a cost effective alternative to meet temperature criteria</li></ul>                                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"><li>▪ Expansion of the wetland to a wet pond would present high capital costs for achievement of all the SWM criteria</li></ul>                                                                                                                                                                                                                                        |
| Results of Alternative Evaluation       | <ul style="list-style-type: none"><li>▪ This is not a preferred alternative because of the complexity of the retrofit due to the existing outlet infrastructure</li></ul>                                                                                                                                 | <ul style="list-style-type: none"><li>▪ This alternative is preferred because it is a minimally invasive best management practice for temperature control. A cooling trench is cost effective and requires minimal maintenance.</li><li>▪ Construction can be designed such that it does not affect adult trees and can be restored such that recreational park land is available.</li></ul>                                                                                       | <ul style="list-style-type: none"><li>▪ This alternative is not a preferred alternative because it would require the removal of mature trees.</li></ul>                                                                                                                                                                                                                                                  |



| Criteria                                                                    | Alternatives for Pond #55                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                  |
|-----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|
|                                                                             | Infiltration in Right-of-Ways (R.O.W.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Bioswales                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                  |
| Alternative Description                                                     | <ul style="list-style-type: none"><li>Install perforated secondary pipe within existing storm sewer systems to allow for infiltration through linear soakaway pits</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"><li>Construct bioswales within the road right-of-ways within the facility drainage area</li><li>Bioswales to contain native plantings and subdrains</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                  |
| Location in Treatment Train                                                 | Conveyance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                  |
| Target SWM Objective(s)                                                     | Erosion and Temperature Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                  |
| Technical Considerations                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                  |
| Constructability and accessibility                                          | <ul style="list-style-type: none"><li>Construction area is extensive and many secondary infiltration pipes would require to be installed to achieve SWM criteria</li><li>Requires coordination with existing infrastructure and utilities</li><li>Based on soil mapping, the soil in the drainage area is conducive to infiltration</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may be more suited as supplementary water quality / erosion / temperature control measures, where constructability and retrofit are least disruptive to existing infrastructure</li><li>Site specific soil testing is required to confirm suitability of infiltration</li></ul> | <ul style="list-style-type: none"><li>Construction area is extensive and pipe networks are more intricate, requiring coordination with existing infrastructure</li><li>Road right of ways need to be conducive to grading and space criteria for bioswales</li><li>Based on soil mapping, the soil in the drainage area is conducive to infiltration</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Bioswales may be more suited as supplementary water quality / erosion / temperature control measures, where constructability and retrofit are least disruptive to existing infrastructure</li><li>Site specific soil testing is required to confirm suitability of infiltration</li></ul> | <ul style="list-style-type: none"><li></li></ul> |
| Ability to meet stormwater management objective(s)                          | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may are more effective when used within a treatment train to achieve the stormwater objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Additional pre-treatment will enhance the function of the perforated pipes, to reduce clogging</li></ul>                                                                                                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"><li>Bioswales are more effective when used within a treatment train to achieve the stormwater objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Additional pre-treatment will enhance the function of bioswales, to reduce clogging of the underdrain pipes</li></ul>                                                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li></li></ul> |
| Engineering best practises / innovative solution                            | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may are innovative solutions within stormwater management</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Enhanced with further use of LIDs such as vegetated filter strips</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"><li>Bioswales are innovative solutions within stormwater management conveyance systems</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Enhanced with further use of LIDs such as vegetated filter strips</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li></li></ul> |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may are effective as part of a treatment train and where retrofit does not greatly interfere with existing infrastructure</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>Bioswales are effective as part of a treatment train and where retrofit does not greatly interfere with existing infrastructure</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"><li></li></ul> |
| Natural Environment                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                  |
| Impacts to wildlife and vegetation habitats                                 | <ul style="list-style-type: none"><li>May require removal of some vegetation depending on specific location; likely few impacts to existing wildlife and vegetation habitats</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Areas disturbed during construction will be restored</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"><li>May require removal of some vegetation depending on specific location</li><li>May present phosphorus issues if not properly designed and/or maintained</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Planted bioswales will enhance neighbourhoods with additional vegetated areas</li></ul>                                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li></li></ul> |
| Impacts / improvements based on SAR / ESA                                   | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) may decrease water temperature, providing benefits to the identified SAR</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may be more suited as supplementary water temperature control measures</li></ul>                                                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>Bioswales may decrease water temperature, providing benefits to the identified SAR</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Bioswales may be more suited as supplementary water temperature control measures</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"><li></li></ul> |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits present few impact on the natural environment</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>Bioswales which are properly designed to avoid phosphorus loading provide positive impact on the natural environment</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li></li></ul> |
| Social Impacts                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                  |
| Requirement of easements or purchase of private lands                       | <ul style="list-style-type: none"><li>To be constructed within municipal R.O.W.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"><li>To be constructed within municipal R.O.W.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"><li></li></ul> |
| Impacts to public and private properties due to construction and operations | <ul style="list-style-type: none"><li>Impacts may include temporary, minor traffic and noise issues due to construction within the residential streets</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Appropriate construction and traffic management schedule to be adhered to</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>Impacts may include temporary, minor traffic and noise issues due to construction within the residential streets</li><li>Bioswales are likely to face public opposition due to the maintenance requirements, visual disruption to an otherwise “clean” front lawn and inconvenience of culverts under driveways</li></ul>                                                                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"><li></li></ul> |

| Criteria                                       | Alternatives for Pond #55                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                    |
|------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
|                                                | Infiltration in Right-of-Ways (R.O.W.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Bioswales                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                    |
|                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Appropriate construction and traffic management schedule to be adhered to</li></ul>                                                                                                                                                                                                                                                                                                                  |                                                    |
| <b>Effect on public safety</b>                 | <ul style="list-style-type: none"><li>▪ No public safety concerns beyond construction period</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Proper signage and safety measures to be set up for construction period</li></ul>                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>▪ No public safety concerns beyond construction period</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Proper signage and safety measures to be set up for construction period</li></ul>                                                                                                                                                                                                             | <ul style="list-style-type: none"><li>▪ </li></ul> |
| <b>Summary / Recommendations</b>               | <ul style="list-style-type: none"><li>▪ Impacts are minor and mostly temporary, within the construction period</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"><li>▪ Impacts during construction are temporary and mostly minor</li><li>▪ Long term impacts on residents due to visual impacts and culvert maintenance may be significant</li></ul>                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>▪ </li></ul> |
| <b>Economic Considerations</b>                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                    |
| <b>Capital costs</b>                           | <ul style="list-style-type: none"><li>▪ Moderate to high capital cost related to new pipe infrastructure, earthworks and plantings, as well as likely relocation of existing pipe infrastructure</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Proficient SUE investigation prior to design work can minimize unexpected existing pipe/utility interferences</li></ul>                                                                                                 | <ul style="list-style-type: none"><li>▪ Moderate to high capital cost related to new pipe infrastructure, earthworks and plantings, as well as likely relocation of existing pipe infrastructure</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Proficient SUE investigation prior to design work can minimize unexpected existing pipe/utility interferences</li></ul>                                                                   | <ul style="list-style-type: none"><li>▪ </li></ul> |
| <b>Maintenance and operating costs</b>         | <ul style="list-style-type: none"><li>▪ Moderate maintenance costs associated with unclogging perforated pipes</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Pre-treatment of stormwater with grassed filter strips can prevent some clogging of perforated pipes</li></ul>                                                                                                                                                                                            | <ul style="list-style-type: none"><li>▪ Low to moderate maintenance costs associated with replacing filter media, unclogging perforated pipes</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Pre-treatment of stormwater with grassed filter strips can prevent some clogging of perforated pipes</li></ul>                                                                                                                               | <ul style="list-style-type: none"><li>▪ </li></ul> |
| <b>Impact on future development and growth</b> | <ul style="list-style-type: none"><li>▪ Retrofit R.O.W. with perforated pipes and soakaway pits may dictate R.O.W. standards for future development</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ On-site control requirements for any future intensification within the watershed would mitigate negative impacts on the LID</li></ul>                                                                                                                                | <ul style="list-style-type: none"><li>▪ Retrofit R.O.W. with bioswales may dictate R.O.W. standards for future development</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Bioswales can enhance the aesthetic appeal of a neighbourhood / development and provide an ‘added value’</li><li>▪ On-site control requirements for any future intensification within the watershed would mitigate negative impacts on the LID</li></ul>        | <ul style="list-style-type: none"><li>▪ </li></ul> |
| <b>Summary / Recommendations</b>               | <ul style="list-style-type: none"><li>▪ Perforated pipes and soakaway pits are a moderate to high capital cost for retrofit and require moderately complex maintenance</li></ul>                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>▪ Bioswales are a moderate to high capital cost for retrofit but may add value to a neighbourhood, depending on general public opinion</li></ul>                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>▪ </li></ul> |
| <b>Results of Alternative Evaluation</b>       | <ul style="list-style-type: none"><li>▪ This alternative is not preferred because infiltration in R.O.W.s cannot provide the required level of water quality and erosion control.</li><li>▪ Another alternative would need to be implemented in conjunction with infiltration in R.O.W.s in order to meet SWM objectives, making this alternative economically inefficient.</li><li>▪ The construction of infiltration pipes in R.O.W.s will create short term accessibility, visual and noise impacts on residents.</li></ul> | <ul style="list-style-type: none"><li>▪ This alternative is not preferred because bioswales cannot provide the required level of water quality and erosion control.</li><li>▪ Another alternative would need to be implemented in conjunction with bioswales in order to meet SWM objectives, making this alternative economically inefficient.</li><li>▪ The construction and maintenance of bioswales will create short and long term accessibility and visual impacts on residents.</li></ul> | <ul style="list-style-type: none"><li>▪ </li></ul> |

| Table 1 –Evaluation of Conceptual Design Alternatives for Pond #62 (Offline Wet Pond) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                      |
|---------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Criteria                                                                              | Alternatives for Pond #62                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                      |
|                                                                                       | Do Nothing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Retrofit Outlet to Extend Detention                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Bottom Draw Outlet in Wet Pond                                                                                                                                                                                                                                                                                                                       |
| Alternative Description                                                               | <ul style="list-style-type: none"> <li>The pond will continue to function as existing</li> <li>Pond #62 is an extended detention wet pond with a 523.45 ha minor drainage area and a 573.74 ha major drainage area</li> </ul>                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"> <li>Construct upgraded outlet structure to increase the extended detention within existing SWM facility</li> </ul>                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>Construct a bottom draw outlet to reduce temperatures of discharged water.</li> </ul>                                                                                                                                                                                                                         |
| Location in Treatment Train                                                           | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | End of Pipe                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                      |
| Target SWM Objective(s)                                                               | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Erosion Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Temperature Control                                                                                                                                                                                                                                                                                                                                  |
| Technical Considerations                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                      |
| Constructability and accessibility                                                    | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>Construction is feasible and within municipally owned lands</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Erosion and sediment control plans</li> </ul>                                                                                                                                                                                                                               | <ul style="list-style-type: none"> <li>Existing pond outlet does not allow for simple retrofit to a bottom draw outlet</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Greater depth enhances the thermal mitigation function of the bottom draw outlet</li> </ul>                             |
| Ability to meet stormwater management objective(s)                                    | <ul style="list-style-type: none"> <li>Does not provide for or meet the stormwater management objectives of the City and/or TRCA, for water quality or erosion</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>No mitigation undertaken</li> </ul>                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Provided that adequate volume can be made available, the adjustment of the outlet can be an effective solution to provide the required extended detention</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Retrofit of the outlet would require upgrade of the available storage volume of the facility</li> <li>Erosion control may be facilitated with use of LIDs upstream</li> </ul> | <ul style="list-style-type: none"> <li>Bottom draw outlets can be effective in decreasing the temperature of the outlet water</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Thermal mitigation would be best achieved with a combination of LID methods</li> </ul>                           |
| Engineering best practises / Innovative solution                                      | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>Typically more traditional SWM approach</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Erosion control may be facilitated with use of LIDs upstream</li> </ul>                                                                                                                                                                                                                         | <ul style="list-style-type: none"> <li>Bottom draw outlets in combination with cooling trenches are recent best management practices</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Thermal mitigation can be enhanced overall with LIDs within the contributing watershed</li> </ul>         |
| Summary / Recommendations                                                             | <ul style="list-style-type: none"> <li>Does not provide for or meet the stormwater management objectives of the City and/or TRCA, for water quality or erosion</li> </ul>                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"> <li>Constructability should be straightforward; may require relocation of existing trail</li> <li>More supplementary alternatives required to provide adequate quality control</li> </ul>                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"> <li>A bottom draw outlet is a recommended outlet alternative for the wet pond to achieve required temperature control</li> </ul>                                                                                                                                                                                  |
| Natural Environment                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                      |
| Impacts to wildlife and vegetation habitats                                           | <ul style="list-style-type: none"> <li>The current condition of wildlife and vegetation habitats will not change; however if the lack of erosion control causes future erosion in the receiving watercourse or future increase of temperature in the watercourse, this could have a negative impact on the future condition of wildlife and vegetation habitats.</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>No mitigation undertaken</li> </ul> | <ul style="list-style-type: none"> <li>Some vegetation will likely be cleared for retrofit of the facility outlet;</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Fisheries and migratory bird timing windows will be adhered to if required;</li> <li>Restoration plans will be developed to restore any cleared vegetation</li> <li>Conceptual design should avoid the removal of existing trees</li> </ul>                 | <ul style="list-style-type: none"> <li>No impact to vegetation</li> <li>May impact aquatic habitat, although fish not anticipated within facility</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Effects could be mitigated with appropriate screens and outflow velocities</li> </ul>        |
| Impacts / Improvements based on SAR / ESA                                             | <ul style="list-style-type: none"> <li>Existing vegetation provides some benefit to reducing water temperature</li> <li>By not implementing temperature controls, receiving waters may have higher temperatures over time and this can negatively impact sensitive species such as Redside Dace</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>No mitigation undertaken</li> </ul>                                                                  | <ul style="list-style-type: none"> <li>Opportunities exist for cooling water before discharging downstream via outlet structures</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Can be enhanced with LID measures upstream</li> <li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li> </ul>                                                             | <ul style="list-style-type: none"> <li>Cooling effects are very beneficial for the potential Redside Dace habitat downstream</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Alternative can be enhanced with LIDs within the watershed and planting techniques within the wet pond</li> </ul> |
| Summary / Recommendations                                                             | <ul style="list-style-type: none"> <li>Existing vegetation of pond provides some benefit regarding thermal regulation</li> <li>Increasing water temperatures decrease water quality and affect the health of aquatic species</li> <li>Existing aquatic and terrestrial vegetation in the pond block provide habitat area and will remain in the current condition</li> </ul>                                                                                                                               | <ul style="list-style-type: none"> <li>Retrofit of the existing outlet will have a low impact to the natural environment</li> <li>If storage volume can be adequately increased, the retrofit of the outlet can provide required erosion control which will increase water quality</li> </ul>                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>Bottom draw outlet is a simple alternative to incorporate into a wet pond for the achievement of temperature control</li> </ul>                                                                                                                                                                               |
| Social Impacts                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                      |
| Requirement of easements or purchase of private lands                                 | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>Not required; block is accessible</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Land requirements would be confirmed through conceptual design</li> </ul>                                                                                                                                                                                                                             | N/A                                                                                                                                                                                                                                                                                                                                                  |
| Impacts to public and private properties due to construction and operations           | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>Potential noise and visual impacts associated with construction for the residences near the pond block</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Construction management plan, including restrictions on hours</li> <li>A staging area should be set up within the</li> </ul>                                                                                                     | <ul style="list-style-type: none"> <li>Impacts are related to the construction of the wet pond</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Bottom draw outlet itself does not present additional impacts</li> </ul>                                                                        |

|                                         | Alternatives for Pond #62                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                       |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Criteria                                | Do Nothing                                                                                                                                                                                                                        | Retrofit Outlet to Extend Detention                                                                                                                                                                                                                                                                                                              | Bottom Draw Outlet in Wet Pond                                                                                                                                                                                                                                                                        |
|                                         |                                                                                                                                                                                                                                   | municipal parkland as to not interfere with traffic or private property                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                       |
| Effect on public safety                 | N/A                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>Retrofit of the outlet itself has low impact on public safety</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Warning signs and fencing (if required) will provide measures of safety</li></ul>                                                        | N/A                                                                                                                                                                                                                                                                                                   |
| Summary / Recommendations               | <ul style="list-style-type: none"><li>The ‘Do Nothing’ alternative has no social impacts</li></ul>                                                                                                                                | <ul style="list-style-type: none"><li>Retrofit of the facility outlet itself is of low impact in regards to noise, traffic and land use</li><li>Scale of construction is relatively small</li></ul>                                                                                                                                              | <ul style="list-style-type: none"><li>There are no social impacts associated with the bottom draw outlet</li></ul>                                                                                                                                                                                    |
| Economic Considerations                 |                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                       |
| Capital costs                           | <ul style="list-style-type: none"><li>No action may result in greater capital expenses in the future</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul> | <ul style="list-style-type: none"><li>Low to moderate cost for the retrofit of the outlet itself</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Capital costs can be marginally reduced if the extended detention volume does not increase significantly from existing conditions</li></ul> | <ul style="list-style-type: none"><li>Low capital cost as standalone item</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation required</li></ul>                                                                                        |
| Maintenance and operating costs         | N/A                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>Low maintenance cost and frequency; likely seasonally to prevent clogging</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Maintenance frequency should be as directed by operations manual</li></ul>                                                   | <ul style="list-style-type: none"><li>Low maintenance costs as standalone; costs associated with maintenance of wet pond</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Maintenance due to clogging can be reduced with proper screens</li></ul> |
| Impact on future development and growth | N/A                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>No impacts</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Limited to the existing land use; higher imperviousness in the watershed would require a larger extended detention volume and therefore altered outlet structure</li></ul>                  | <ul style="list-style-type: none"><li>No impacts</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                                                                                                         |
| Summary / Recommendations               | <ul style="list-style-type: none"><li>‘Do nothing’ may postpone required works and increase future costs</li></ul>                                                                                                                | <ul style="list-style-type: none"><li>Retrofit of the existing outlet to provide the required extended detention is a relatively low cost solution in itself; the corresponding requirement to increase the detention volume will increase the capital cost</li></ul>                                                                            | <ul style="list-style-type: none"><li>Bottom draw outlet is a cost effective alternative to incorporate into wet pond design to meet temperature criteria</li></ul>                                                                                                                                   |
| Results of Alternative Evaluation       | <ul style="list-style-type: none"><li>This alternative is not preferred because the alternative does not meet the stormwater management objectives</li></ul>                                                                      | <ul style="list-style-type: none"><li>This alternative is preferred to provide cost-effective erosion control while retaining the existing pond grading and trees</li></ul>                                                                                                                                                                      | <ul style="list-style-type: none"><li>This is not a preferred alternative because of the complexity of the retrofit due to the existing outlet infrastructure</li></ul>                                                                                                                               |



|                                                    | Alternatives for Pond #62                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Criteria                                           | Aquatic and Riparian Plantings at Facility                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Cooling Trench                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Underground Storage Tanks / Infiltration Galleries                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Alternative Description                            | <ul style="list-style-type: none"><li>Plantings to increase density and area of vegetation cover surrounding facility and within facility to provide shade for cooling of detained water</li></ul>                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"><li>Excavation of a trench between the pond control structure maintenance hole and the outlet</li><li>Modification of outlet piping infrastructure to discharge into trench</li><li>Installation of stone material and restoration of ground surface</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>Ideally installed in municipally owned lands including parks and the pond land parcel</li><li>Underground storage tanks / infiltration galleries will capture and detain stormwater and release over an extended time period, similar to soakaway pits</li><li>Infiltration type underground tanks will allow for infiltration during detention period</li><li>May need water quality control prior to infiltrating (if infiltration is proposed)</li></ul>                                                                                                                                                                         |
| Location in Treatment Train                        | End of Pipe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Target SWM Objective(s)                            | Temperature Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Erosion and Temperature Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Technical Considerations                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Constructability and accessibility                 | <ul style="list-style-type: none"><li>No constructability issues anticipated with adding plantings to proposed facilities</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Plantings enhance temperature control by providing shade</li></ul>                                                                                                                                                                                                     | <ul style="list-style-type: none"><li>Feasible construction and accessibility is good</li><li>Construction footprint is relatively small</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Erosion and sediment control plans required</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>Footprints can be small, but additional space must be found throughout the watershed, upstream of the existing SWM pond</li><li>Requires re-organization of some existing storm infrastructure</li><li>Based on soil mapping, the soil in the drainage area is conducive to infiltration</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Tanks / infiltration galleries with infiltration capabilities provide additional benefits for erosion control upstream of the SWM pond</li><li>Site specific soil testing is required to confirm suitability of infiltration</li></ul> |
| Ability to meet stormwater management objective(s) | <ul style="list-style-type: none"><li>Shade from plantings will reduce the temperature of stormwater at a facility</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Plantings are better used in conjunction with other cooling methods to achieve adequate temperature control</li></ul>                                                                                                                                                         | <ul style="list-style-type: none"><li>Cooling trenches can be effective in decreasing the temperature of the outlet water</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Thermal mitigation would be best achieved with a combination of LID methods</li></ul>                                                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>Underground tanks, especially with infiltration capabilities, are effective for providing erosion and temperature control</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Longer detention times enhance erosion control and help the pond to function with fewer sedimentation issues</li></ul>                                                                                                                                                                                                                                                                                |
| Engineering best practises / innovative solution   | <ul style="list-style-type: none"><li>Temperature control of stormwater in general is becoming an engineering best management practice in areas with sensitive habitats</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Effects of plantings can be enhanced with other methods such as use of a bottom draw outlet</li></ul>                                                                                                                    | <ul style="list-style-type: none"><li>Cooling trenches are a recent best management practice</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Thermal mitigation can be enhanced overall with LIDs within the contributing watershed</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"><li>Underground tanks, including infiltration, are noted as best management practices</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Maintenance of underground tanks / infiltration galleries is more extensive than at-grade alternatives</li></ul>                                                                                                                                                                                                                                                                                                                              |
| Summary / Recommendations                          | <ul style="list-style-type: none"><li>Plantings at stormwater management facility are a simple alternative to provide additional temperature controls</li></ul>                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>Technically feasible with a small construction footprint</li><li>A cooling trench would help with mitigating the temperature impacts of the SWM pond</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"><li>Technically feasible, requiring more intrusive maintenance</li><li>Constructability within existing terrain is low to moderate and can be incorporated into existing lands such as parks and R.O.W.s</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Natural Environment                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Impacts to wildlife and vegetation habitats        | <ul style="list-style-type: none"><li>Planting native species can enhance the existing wildlife and vegetation</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul>                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>Existing vegetation in the work area will be cleared</li><li>All affected areas will be restored</li><li>Results in a net neutral effect to terrestrial habitat</li><li>Reduction of temperature released into the downstream cool-water watercourse will improve the native aquatic habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Appropriate erosion and sediment control measures will be undertaken during construction to reduce any negative impacts to the downstream watercourse</li><li>Restoration plans will be developed for surrounding areas impacted by construction</li></ul> | <ul style="list-style-type: none"><li>May require removal of some vegetation depending on specific location</li><li>Once installed, less intrusive than other alternatives because of location below grade</li><li>May reduce terrestrial habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Restoration plan required if loss of vegetation expected due to construction</li><li>Conceptual design should avoid the removal of existing trees</li></ul>                                                                                                                                                         |
| Impacts / improvements based on SAR / ESA          | <ul style="list-style-type: none"><li>Providing additional shade at stormwater facilities reduces stormwater temperature which is a key benefit for SAR habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Effects of plantings can be enhanced with other methods such as use of a bottom draw outlet</li><li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li></ul> | <ul style="list-style-type: none"><li>There are opportunities to improve the habitat quality of the receiving watercourse by reducing the temperature of flows entering the watercourse</li><li>Cooling effects are very beneficial for Redside Dace habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li></ul>                                                                                                                                                                                                     | <ul style="list-style-type: none"><li>Underground tanks may decrease water temperature, providing benefits to the identified SAR</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li></ul>                                                                                                                                                                                                                                                                                                         |
| Summary / Recommendations                          | <ul style="list-style-type: none"><li>Plantings at stormwater facilities provide positive impacts on the natural environment</li></ul>                                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>A cooling trench at the pond outlet is a relatively simple alternative to mitigate</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>Underground tanks / infiltration galleries are a long-term non-invasive alternative for</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

| Criteria                                                                    | Alternatives for Pond #62                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                             | Aquatic and Riparian Plantings at Facility                                                                                                                                                                                                                                                 | Cooling Trench                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Underground Storage Tanks / Infiltration Galleries                                                                                                                                                                                                                                                                                                                                                |
|                                                                             | (provided they are non-invasive species)                                                                                                                                                                                                                                                   | temperatures impacts of the wet pond for the achievement of temperature control                                                                                                                                                                                                                                                                                                                                                                                              | providing erosion control <ul style="list-style-type: none"><li>This alternative may be a viable solution to provide erosion control without disruption to the existing pond volume</li></ul>                                                                                                                                                                                                     |
| Social Impacts                                                              |                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                   |
| Requirement of easements or purchase of private lands                       | <ul style="list-style-type: none"><li>Not applicable (unless required in conjunction with stormwater facility construction)</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                   | <ul style="list-style-type: none"><li>Not required</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"><li>Sufficient space is appears to be available within municipal park lands and/or school yard</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>If school yard provides the best available space to construct an infiltration gallery, a form of compensation may be negotiated</li></ul>                    |
| Impacts to public and private properties due to construction and operations | <ul style="list-style-type: none"><li>No impacts to public</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                                                                                    | <ul style="list-style-type: none"><li>Noise and visual impacts associated with construction for the residences near the SWM facility block</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Construction management plan, including restrictions on hours may reduce inconveniences associated with construction</li></ul>                                                                                                | <ul style="list-style-type: none"><li>Construction preferred to be within municipal park lands; impacts may include temporary, minor traffic and noise issues due to proximity to residential neighbourhood</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Proper signage and safety measures to be set up for construction period</li></ul> |
| Effect on public safety                                                     | <ul style="list-style-type: none"><li>Vegetation should be suitable for proposed facility and clearly indicate any water’s edge</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Vegetation at facilities must be maintained</li></ul>  | <ul style="list-style-type: none"><li>The cooling trench will not have any affects on public safety once constructed</li><li>During construction there is a potential safety risk due to excavation if a member of the public was to enter the site</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>The construction site should be secured during and after construction hours with warning signs and fencing</li></ul> | <ul style="list-style-type: none"><li>No public safety concerns beyond construction period</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Proper signage and safety measures to be set up for construction period</li></ul>                                                                                                                  |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>No significant social impacts of plantings at stormwater facilities</li></ul>                                                                                                                                                                        | <ul style="list-style-type: none"><li>No long term social impacts associated with the cooling trench</li><li>Minimal disturbance to the public may occur during construction but the construction time frame will be brief</li></ul>                                                                                                                                                                                                                                         | <ul style="list-style-type: none"><li>Underground tanks / infiltration galleries are proposed to be ideally located in public lands, generally not intrusive to the public during or after construction</li></ul>                                                                                                                                                                                 |
| Economic Considerations                                                     |                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                   |
| Capital costs                                                               | <ul style="list-style-type: none"><li>Low capital cost relative to other alternatives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Costs may vary depending on extents and types of plantings</li></ul>                             | <ul style="list-style-type: none"><li>Low capital cost for a relatively small excavation and materials</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Capital costs can be marginally reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required trench volume)</li></ul>                                                                                                      | <ul style="list-style-type: none"><li>Moderate capital cost related to storage tank / infiltration gallery infrastructure</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Efficient tank design to minimize capital costs</li><li>Adequate soils and extend of earthworks will affect capital cost</li></ul>                                  |
| Maintenance and operating costs                                             | <ul style="list-style-type: none"><li>Low maintenance costs with native, sustainable plantings</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Lower maintenance plants will minimize costs of maintenance and/or replanting</li></ul> | <ul style="list-style-type: none"><li>Low maintenance cost associated with cleaning out the trench</li><li>Lower maintenance frequency; likely once per year</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Maintenance frequency should be as directed by operations manual</li></ul>                                                                                                                                  | <ul style="list-style-type: none"><li>Low maintenance costs associated with cleaning out tanks / galleries as per operations manual or in event of clogging</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Can prevent clogging with additional pre-treatment techniques</li></ul>                                                           |
| Impact on future development and growth                                     | <ul style="list-style-type: none"><li>No impact on future development</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                                                                         | <ul style="list-style-type: none"><li>No impacts</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>No impact, but underground tanks would require expansion if contributing land use was to intensify</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>On-site control requirements for any future intensification within the watershed would mitigate further expansion</li></ul>                          |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>Plantings at SWM facilities are a low cost alternative for providing temperature control</li></ul>                                                                                                                                                   | <ul style="list-style-type: none"><li>A cooling trench is a cost effective alternative to meet temperature criteria</li></ul>                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>Underground tanks can provide reasonable capital and maintenance costs for the achievement of erosion control</li><li>Capital costs can fluctuate based on actual conditions at the specific location chosen at conceptual design</li></ul>                                                                                                                 |
| Results of Alternative Evaluation                                           | <ul style="list-style-type: none"><li>This alternative is preferred because it will improve/maintain existing habitat and vegetation</li><li>This alternative provides temperature control at a relatively low capital cost.</li></ul>                                                     | <ul style="list-style-type: none"><li>This alternative is preferred because it is a minimally invasive best management practice for temperature control. A cooling trench is cost effective and requires minimal maintenance.</li><li>Construction can be designed such that it does not affect adult trees</li></ul>                                                                                                                                                        | <ul style="list-style-type: none"><li>This is not a preferred alternative because it is a more costly option and will create more disturbance than retrofitting the existing outlet</li></ul>                                                                                                                                                                                                     |

| Criteria                                                                    | Alternatives for Pond #62                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |
|-----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
|                                                                             | Infiltration in Right-of-Ways (R.O.W.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Bioswales                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |
| Alternative Description                                                     | <ul style="list-style-type: none"><li>▪ Install perforated secondary pipe within existing storm sewer systems to allow for infiltration through linear soakaway pits</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"><li>▪ Construct bioswales within the road right-of-ways within the facility drainage area</li><li>▪ Bioswales to contain native plantings and subdrains</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |
|                                                                             | Conveyance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |
|                                                                             | Quality, Erosion and Temperature Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |
| Technical Considerations                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |
| Constructability and accessibility                                          | <ul style="list-style-type: none"><li>▪ Construction area is extensive and many secondary infiltration pipes would require to be installed to achieve SWM criteria</li><li>▪ Requires coordination with existing infrastructure and utilities</li><li>▪ Based on soil mapping, the soil in the drainage area is conducive to infiltration</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Perforated pipes (exfiltration pipes) and soakaway pits may be more suited as supplementary water quality / erosion / temperature control measures, where constructability and retrofit are least disruptive to existing infrastructure</li><li>▪ Site specific soil testing is required to confirm suitability of infiltration</li></ul> | <ul style="list-style-type: none"><li>▪ Construction area is extensive and pipe networks are more intricate, requiring coordination with existing infrastructure</li><li>▪ Road right of ways need to be conducive to grading and space criteria for bioswales</li><li>▪ Based on soil mapping, the soil in the drainage area is conducive to infiltration</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Bioswales may be more suited as supplementary water quality / erosion / temperature control measures, where constructability and retrofit are least disruptive to existing infrastructure</li><li>▪ Site specific soil testing is required to confirm suitability of infiltration</li></ul> |  |
| Ability to meet stormwater management objective(s)                          | <ul style="list-style-type: none"><li>▪ Perforated pipes (exfiltration pipes) and soakaway pits may are more effective when used within a treatment train to achieve the stormwater objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Additional pre-treatment will enhance the function of the perforated pipes, to reduce clogging</li></ul>                                                                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"><li>▪ Bioswales are more effective when used within a treatment train to achieve the stormwater objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Additional pre-treatment will enhance the function of bioswales, to reduce clogging of the underdrain pipes</li></ul>                                                                                                                                                                                                                                                                                                                                                                                     |  |
| Engineering best practises / innovative solution                            | <ul style="list-style-type: none"><li>▪ Perforated pipes (exfiltration pipes) and soakaway pits may are innovative solutions within stormwater management</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Enhanced with further use of LIDs such as vegetated filter strips</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>▪ Bioswales are innovative solutions within stormwater management conveyance systems</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Enhanced with further use of LIDs such as vegetated filter strips</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>▪ Perforated pipes (exfiltration pipes) and soakaway pits may are effective as part of a treatment train and where retrofit does not greatly interfere with existing infrastructure</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"><li>▪ Bioswales are effective as part of a treatment train and where retrofit does not greatly interfere with existing infrastructure</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |
| Natural Environment                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |
| Impacts to wildlife and vegetation habitats                                 | <ul style="list-style-type: none"><li>▪ May require removal of some vegetation depending on specific location; likely few impacts to existing wildlife and vegetation habitats</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Areas disturbed during construction will be restored</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"><li>▪ May require removal of some vegetation depending on specific location</li><li>▪ May present phosphorus issues if not properly designed and/or maintained</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Planted bioswales will enhance neighbourhoods with additional vegetated areas</li></ul>                                                                                                                                                                                                                                                                                                                                                               |  |
| Impacts / improvements based on SAR / ESA                                   | <ul style="list-style-type: none"><li>▪ Perforated pipes (exfiltration pipes) may decrease water temperature, providing benefits to the identified SAR</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Perforated pipes (exfiltration pipes) and soakaway pits may be more suited as supplementary water temperature control measures</li></ul>                                                                                                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"><li>▪ Bioswales may decrease water temperature, providing benefits to the identified SAR</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Bioswales may be more suited as supplementary water temperature control measures</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>▪ Perforated pipes (exfiltration pipes) and soakaway pits present few impact on the natural environment</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"><li>▪ Bioswales which are properly designed to avoid phosphorus loading provide positive impact on the natural environment</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |
| Social Impacts                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |
| Requirement of easements or purchase of private lands                       | <ul style="list-style-type: none"><li>▪ To be constructed within municipal R.O.W.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Not applicable</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"><li>▪ To be constructed within municipal R.O.W.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Not applicable</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |
| Impacts to public and private properties due to construction and operations | <ul style="list-style-type: none"><li>▪ Impacts may include temporary, minor traffic and noise issues due to construction within the residential streets</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Appropriate construction and traffic management schedule to be adhered to</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"><li>▪ Impacts may include temporary, minor traffic and noise issues due to construction within the residential streets</li><li>▪ Bioswales are likely to face public opposition due to the maintenance requirements, visual disruption to an otherwise “clean” front lawn and inconvenience of culverts under driveways</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b>                                                                                                                                                                                                                                                                                                                                      |  |

| Criteria                                | Alternatives for Pond #62                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
|                                         | Infiltration in Right-of-Ways (R.O.W.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Bioswales                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |
|                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>▪ Appropriate construction and traffic management schedule to be adhered to</li></ul>                                                                                                                                                                                                                                                                                                                                                                      |  |
| Effect on public safety                 | <ul style="list-style-type: none"><li>▪ No public safety concerns beyond construction period</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Proper signage and safety measures to be set up for construction period</li></ul>                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>▪ No public safety concerns beyond construction period</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Proper signage and safety measures to be set up for construction period</li></ul>                                                                                                                                                                                                             |  |
| Summary / Recommendations               | <ul style="list-style-type: none"><li>▪ Impacts are minor and mostly temporary, within the construction period</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"><li>▪ Impacts during construction are temporary and mostly minor</li><li>▪ Long term impacts on residents due to visual impacts and culvert maintenance may be significant</li></ul>                                                                                                                                                                                                                                                                           |  |
| Economic Considerations                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Capital costs                           | <ul style="list-style-type: none"><li>▪ Moderate to high capital cost related to new pipe infrastructure, earthworks and plantings, as well as likely relocation of existing pipe infrastructure</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Proficient SUE investigation prior to design work can minimize unexpected existing pipe/utility interferences</li></ul>                                                                                                 | <ul style="list-style-type: none"><li>▪ Moderate to high capital cost related to new pipe infrastructure, earthworks and plantings, as well as likely relocation of existing pipe infrastructure</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Proficient SUE investigation prior to design work can minimize unexpected existing pipe/utility interferences</li></ul>                                                                   |  |
| Maintenance and operating costs         | <ul style="list-style-type: none"><li>▪ Moderate maintenance costs associated with unclogging perforated pipes</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Pre-treatment of stormwater with grassed filter strips can prevent some clogging of perforated pipes</li></ul>                                                                                                                                                                                            | <ul style="list-style-type: none"><li>▪ Low to moderate maintenance costs associated with replacing filter media, unclogging perforated pipes</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Pre-treatment of stormwater with grassed filter strips can prevent some clogging of perforated pipes</li></ul>                                                                                                                               |  |
| Impact on future development and growth | <ul style="list-style-type: none"><li>▪ Retrofit R.O.W. with perforated pipes and soakaway pits may dictate R.O.W. standards for future development</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ On-site control requirements for any future intensification within the watershed would mitigate negative impacts on the LID</li></ul>                                                                                                                                | <ul style="list-style-type: none"><li>▪ Retrofit R.O.W. with bioswales may dictate R.O.W. standards for future development</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Bioswales can enhance the aesthetic appeal of a neighbourhood / development and provide an ‘added value’</li><li>▪ On-site control requirements for any future intensification within the watershed would mitigate negative impacts on the LID</li></ul>        |  |
| Summary / Recommendations               | <ul style="list-style-type: none"><li>▪ Perforated pipes and soakaway pits are a moderate to high capital cost for retrofit and require moderately complex maintenance</li></ul>                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>▪ Bioswales are a moderate to high capital cost for retrofit but may add value to a neighbourhood, depending on general public opinion</li></ul>                                                                                                                                                                                                                                                                                                           |  |
| Results of Alternative Evaluation       | <ul style="list-style-type: none"><li>▪ This alternative is not preferred because infiltration in R.O.W.s cannot provide the required level of water quality and erosion control.</li><li>▪ Another alternative would need to be implemented in conjunction with infiltration in R.O.W.s in order to meet SWM objectives, making this alternative economically inefficient.</li><li>▪ The construction of infiltration pipes in R.O.W.s will create short term accessibility, visual and noise impacts on residents.</li></ul> | <ul style="list-style-type: none"><li>▪ This alternative is not preferred because bioswales cannot provide the required level of water quality and erosion control.</li><li>▪ Another alternative would need to be implemented in conjunction with bioswales in order to meet SWM objectives, making this alternative economically inefficient.</li><li>▪ The construction and maintenance of bioswales will create short and long term accessibility and visual impacts on residents.</li></ul> |  |



| Criteria                                           | Alternatives for Pond #73                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                    | Do Nothing                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Underground Storage Tanks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Aquatic and Riparian Plantings at Facility                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Alternative Description                            | <ul style="list-style-type: none"><li>The pond will continue to function as existing</li><li>Pond #73 is an offline existing wet pond with a 25.7 ha minor drainage area and a 56.2 ha major drainage area</li></ul>                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"><li>Installed in municipal owned lands including parks and the wetland land parcel</li><li>Underground storage tanks will capture and detain stormwater and release over an extended time period</li><li>Infiltration type underground tanks will allow for infiltration during detention period</li><li>May need water quality control prior to infiltrating (if infiltration is proposed)</li></ul>                                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"><li>Plantings to increase density and area of vegetation cover surrounding facility and within facility to provide shade for cooling of detained water</li></ul>                                                                                                                                                                                                                                                                                                   |
| Location in Treatment Train                        | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | End of Pipe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Target SWM Objective(s)                            | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Temperature Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Technical Considerations                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Constructability and accessibility                 | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"><li>Footprint may be large and depends on available soil conditions; constructability is moderate to complex due to space restrictions within the pond block</li><li>Requires re-organization of existing outfalls to feed into central underground tank(s) either prior to entering the pond or likely after</li><li>Based on soil mapping, the soil in the drainage area is not ideal for infiltration</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Tanks with infiltration capabilities provide additional benefits for temperature control</li><li>Site specific soil testing is required to confirm suitability of infiltration</li></ul> | <ul style="list-style-type: none"><li>Plantings need to be adaptable to the existing SWM pond</li><li>Fairly dense planting of young trees around perimeter of pond</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Plantings enhance temperature control by providing shade</li></ul>                                                                                                                                                           |
| Ability to meet stormwater management objective(s) | <ul style="list-style-type: none"><li>Does not provide for or meet the stormwater management objectives of the City and/or TRCA, for temperature control</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul>                                                                                                                                                                             | <ul style="list-style-type: none"><li>Underground tanks, especially with infiltration capabilities, may be effective for providing temperature control</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Depth below grade can enhance temperature control</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>Shade from plantings will reduce the temperature of stormwater at a facility</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Plantings are better used in conjunction with other cooling methods to achieve adequate temperature control</li></ul>                                                                                                                                                         |
| Engineering best practises / Innovative solution   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"><li>Underground tanks, including infiltration, are noted as best management practices</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Maintenance of underground tanks is more extensive than at-grade alternatives</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"><li>Temperature control of stormwater in general is becoming an engineering best management practice in areas with sensitive habitats</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Effects of plantings can be enhanced with other methods such as use of a bottom draw outlet</li></ul>                                                                                                                    |
| Summary / Recommendations                          | <ul style="list-style-type: none"><li>Does not provide for or meet the stormwater management objectives of the City and/or TRCA, for temperature control</li></ul>                                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"><li>Technically feasible, requiring more intrusive maintenance</li><li>Constructability within existing terrain is moderate to complex due to terrain and limited space within the pond block and easement</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>Plantings at stormwater management facility are a simple alternative to provide additional temperature controls</li><li>Fairly dense planting of young trees exist around perimeter currently</li></ul>                                                                                                                                                                                                                                                        |
| Natural Environment                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Impacts to wildlife and vegetation habitats        | <ul style="list-style-type: none"><li>The current condition of wildlife and vegetation habitats will not change; however if the lack of temperature control causes future increase of temperature in the receiving watercourse, this could have a negative impact on the future condition of aquatic habitat and wildlife downstream</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul> | <ul style="list-style-type: none"><li>Would require removal of some vegetation depending on specific location</li><li>Once installed, less intrusive than other alternatives because of location below grade</li><li>May reduce terrestrial habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Restoration plan required if loss of vegetation expected due to construction</li><li>Migratory bird windows to be adhered to for construction</li><li>Conceptual design will minimize the impact on existing trees</li></ul>                                                                                                                                                    | <ul style="list-style-type: none"><li>Planting native species can enhance the existing wildlife and vegetation</li><li>Pond already has existing young trees around perimeter</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul>                                                                                                                                                                                 |
| Impacts / Improvements based on SAR / ESA          | <ul style="list-style-type: none"><li>Existing vegetation provides some benefit to reducing water temperature</li><li>By not implementing temperature controls, receiving waters may have higher temperatures over time and this can negatively impact sensitive species such as Redside Dace</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul>                                        | <ul style="list-style-type: none"><li>Underground tanks may decrease water temperature, providing benefits to the identified SAR</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li></ul>                                                                                                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"><li>Providing additional shade at stormwater facilities reduces stormwater temperature which is a key benefit for SAR habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Effects of plantings can be enhanced with other methods such as use of a bottom draw outlet</li><li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li></ul> |
| Summary / Recommendations                          | <ul style="list-style-type: none"><li>Existing vegetation of wetland provides some benefit regarding thermal regulation</li><li>Increasing water temperatures decrease water quality and affect the health of aquatic species</li><li>Existing aquatic and terrestrial vegetation in the pond block provide habitat area and will</li></ul>                                                                                                                                 | <ul style="list-style-type: none"><li>Underground tanks are a long-term non-invasive alternative for providing erosion and temperature control</li><li>Trees may be retained during construction</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"><li>Plantings at stormwater facilities provide positive impacts on the natural environment (provided they are non-invasive species)</li><li>Perimeter of pond contains dense planting of young trees</li></ul>                                                                                                                                                                                                                                                     |

| Criteria                                                                    | Alternatives for Pond #73                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                |
|-----------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                             | Do Nothing                                                                                                                                                                                                                                                         | Underground Storage Tanks                                                                                                                                                                                                                                                                                                                                                                   | Aquatic and Riparian Plantings at Facility                                                                                                                                                                                                                                                     |
|                                                                             | remain in the current condition                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                |
| Social Impacts                                                              |                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                |
| Requirement of easements or purchase of private lands                       | N/A                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>Adequate space is likely for an underground tank; however is space is tight, acquisition of additional lands is not a preferred option</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not required</li> </ul>                                                                                 | <ul style="list-style-type: none"> <li>Not applicable (unless required in conjunction with stormwater facility construction)</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not applicable</li> </ul>                                   |
| Impacts to public and private properties due to construction and operations | N/A                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>Construction anticipated within easement lands; impacts may include temporary, minor traffic and noise issues due to proximity to residential neighbourhood</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Proper signage and safety measures to be set up for construction period</li> </ul> | <ul style="list-style-type: none"> <li>No impacts to public</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not applicable</li> </ul>                                                                                                    |
| Effect on public safety                                                     | N/A                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>No public safety concerns beyond construction period</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Proper signage and safety measures to be set up for construction period</li> </ul>                                                                                                        | <ul style="list-style-type: none"> <li>Vegetation should be suitable for proposed facility and clearly indicate any water’s edge</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Vegetation at facilities must be maintained</li> </ul>  |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"> <li>The ‘Do Nothing’ alternative has no social impacts</li> </ul>                                                                                                                                                               | <ul style="list-style-type: none"> <li>Underground tanks are proposed to be located in public lands, generally not intrusive to the public during or after construction</li> </ul>                                                                                                                                                                                                          | <ul style="list-style-type: none"> <li>No significant social impacts of plantings at stormwater facilities</li> </ul>                                                                                                                                                                          |
| Economic Considerations                                                     |                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                |
| Capital costs                                                               | <ul style="list-style-type: none"> <li>No action may result in greater capital expenses in the future regarding habitat protection</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not applicable</li> </ul> | <ul style="list-style-type: none"> <li>Moderate capital cost related to storage tank infrastructure</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Efficient tank design to minimize capital costs</li> <li>Adequate soils and extend of earthworks will affect capital cost</li> </ul>                                              | <ul style="list-style-type: none"> <li>Low capital cost relative to other alternatives</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Costs may vary depending on extents and types of plantings</li> </ul>                             |
| Maintenance and operating costs                                             | N/A                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>Low maintenance costs associated with cleaning out tanks as per operations manual or in event of clogging</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Can prevent clogging with additional pre-treatment techniques</li> </ul>                                                             | <ul style="list-style-type: none"> <li>Low maintenance costs with native, sustainable plantings</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Lower maintenance plants will minimize costs of maintenance and/or replanting</li> </ul> |
| Impact on future development and growth                                     | N/A                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>No impact, but underground tanks would likely require expansion if contributing land use was to intensify</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Additional LIDs in the watershed may mitigate further expansion</li> </ul>                                                           | <ul style="list-style-type: none"> <li>No impact on future development</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not applicable</li> </ul>                                                                                         |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"> <li>‘Do nothing’ may postpone required works and increase future costs</li> </ul>                                                                                                                                               | <ul style="list-style-type: none"> <li>Underground tanks can provide moderate capital and maintenance costs for the achievement of temperature control</li> <li>Capital costs can fluctuate based on actual conditions at the specific location chosen at conceptual design</li> </ul>                                                                                                      | <ul style="list-style-type: none"> <li>Plantings at SWM facilities are a low cost alternative for providing temperature control</li> </ul>                                                                                                                                                     |
| Results of Alternative Evaluation                                           | <ul style="list-style-type: none"> <li>This alternative is not preferred because the alternative does not meet the stormwater management objectives</li> </ul>                                                                                                     | <ul style="list-style-type: none"> <li>This is not a preferred alternative because it is a more costly option and will create more disturbance than the preferred alternatives</li> </ul>                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>This alternative is not preferred because there is already a dense planting of young trees around the perimeter of the pond</li> <li>This alternative provides temperature control at a relatively low capital cost</li> </ul>                          |

| Criteria                                           | Alternatives for Pond #73                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                    | Infiltration in Right-of-Ways (R.O.W.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Bioswales                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Cooling Trench                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Alternative Description                            | <ul style="list-style-type: none"><li>▪ Install perforated secondary pipe within existing storm sewer systems to allow for infiltration through linear soakaway pits</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"><li>▪ Construct bioswales within the road right-of-ways within the facility drainage area</li><li>▪ Bioswales to contain native plantings and subdrains</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>▪ Excavation of a trench between the pond control structure maintenance hole and the outlet</li><li>▪ Modification of outlet piping infrastructure to discharge into trench</li><li>▪ Installation of stone material and restoration of ground surface</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Location in Treatment Train                        | Conveyance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | End of Pipe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Target SWM Objective(s)                            | Temperature Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Technical Considerations                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Constructability and accessibility                 | <ul style="list-style-type: none"><li>▪ Construction area is extensive and many secondary infiltration pipes would require to be installed to achieve SWM criteria</li><li>▪ Requires coordination with existing infrastructure and utilities</li><li>▪ Based on soil mapping, the soil in the drainage area is not ideal for infiltration</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Perforated pipes (exfiltration pipes) and soakaway pits may be more suited as supplementary water quality / erosion / temperature control measures, where constructability and retrofit are least disruptive to existing infrastructure</li><li>▪ Site specific soil testing is required to confirm suitability of infiltration</li></ul> | <ul style="list-style-type: none"><li>▪ Construction area is extensive and pipe networks are more intricate, requiring coordination with existing infrastructure</li><li>▪ Road right of ways need to be conducive to grading and space criteria for bioswales</li><li>▪ Based on soil mapping, the soil in the drainage area is not ideal for infiltration</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Bioswales may be more suited as supplementary water quality / erosion / temperature control measures, where constructability and retrofit are least disruptive to existing infrastructure</li><li>▪ Site specific soil testing is required to confirm suitability of infiltration</li></ul> | <ul style="list-style-type: none"><li>▪ Feasible construction; site is highly accessible</li><li>▪ Construction footprint is relatively small</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Erosion and sediment control plans required</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Ability to meet stormwater management objective(s) | <ul style="list-style-type: none"><li>▪ Perforated pipes (exfiltration pipes) and soakaway pits may are more effective when used within a treatment train to achieve the stormwater objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Additional pre-treatment will enhance the function of the perforated pipes, to reduce clogging</li></ul>                                                                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"><li>▪ Bioswales are more effective when used within a treatment train to achieve the stormwater objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Additional pre-treatment will enhance the function of bioswales, to reduce clogging of the underdrain pipes</li></ul>                                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>▪ Cooling trenches can be effective in decreasing the temperature of the outlet water</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Thermal mitigation would be best achieved with a combination of LID methods</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Engineering best practises / innovative solution   | <ul style="list-style-type: none"><li>▪ Perforated pipes (exfiltration pipes) and soakaway pits may are innovative solutions within stormwater management</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Enhanced with further use of LIDs such as vegetated filter strips</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>▪ Bioswales are innovative solutions within stormwater management conveyance systems</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Enhanced with further use of LIDs such as vegetated filter strips</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>▪ Cooling trenches are a recent best management practice</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Thermal mitigation can be enhanced overall with LIDs within the contributing watershed</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Summary / Recommendations                          | <ul style="list-style-type: none"><li>▪ Perforated pipes (exfiltration pipes) and soakaway pits may are effective as part of a treatment train and where retrofit does not greatly interfere with existing infrastructure</li><li>▪ Due to the poor infiltration in the soil, Infiltration in the R.O.W. is not a preferred option.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"><li>▪ Bioswales are effective as part of a treatment train and where retrofit does not greatly interfere with existing infrastructure</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"><li>▪ Technically feasible with a small construction footprint</li><li>▪ A cooling trench would help with mitigating the temperature impacts of the SWM pond</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Natural Environment                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Impacts to wildlife and vegetation habitats        | <ul style="list-style-type: none"><li>▪ May require removal of some vegetation depending on specific location; likely few impacts to existing wildlife and vegetation habitats</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Areas disturbed during construction will be restored</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"><li>▪ May require removal of some vegetation depending on specific location</li><li>▪ May present phosphorus issues if not properly designed and/or maintained</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Planted bioswales will enhance neighbourhoods with additional vegetated areas</li></ul>                                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>▪ Existing vegetation in the work area will be cleared</li><li>▪ All affected areas will be restored</li><li>▪ Results in a net neutral effect to terrestrial habitat</li><li>▪ Reduction of temperature released into the downstream cool-water watercourse will improve the native aquatic habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Appropriate erosion and sediment control measures will be undertaken during construction to reduce any negative impacts to the downstream watercourse</li><li>▪ Restoration plans will be developed for surrounding areas impacted by construction</li><li>▪ Conceptual design will minimize the impact on existing trees</li></ul> |
| Impacts / improvements based on SAR / ESA          | <ul style="list-style-type: none"><li>▪ Perforated pipes (exfiltration pipes) may decrease water temperature, providing benefits to the identified SAR</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Perforated pipes (exfiltration pipes) and soakaway pits may be more suited as supplementary water temperature control measures</li></ul>                                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>▪ Bioswales may decrease water temperature, providing benefits to the identified SAR</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Bioswales may be more suited as supplementary water temperature control measures</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"><li>▪ There are opportunities to improve the habitat quality of the receiving watercourse by reducing the temperature of flows entering the watercourse</li><li>▪ Cooling effects are very beneficial for Redside Dace habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li></ul>                                                                                                                                                                                                                                                                                  |

| Criteria                                                                    | Alternatives for Pond #73                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                             | Infiltration in Right-of-Ways (R.O.W.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Bioswales                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Cooling Trench                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits present few impact on the natural environment</li></ul>                                                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"><li>Bioswales which are properly designed to avoid phosphorus loading provide positive impact on the natural environment</li></ul>                                                                                                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"><li>A cooling trench at the pond outlet is a relatively simple alternative to mitigate temperatures impacts of the wet pond for the achievement of temperature control</li><li>Existing trees may be retained during construction</li></ul>                                                                                                                                                                |
| Social Impacts                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Requirement of easements or purchase of private lands                       | <ul style="list-style-type: none"><li>To be constructed within municipal R.O.W.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"><li>To be constructed within municipal R.O.W.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>Not required</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                                                                                                                                                                                                                                              |
| Impacts to public and private properties due to construction and operations | <ul style="list-style-type: none"><li>Impacts may include temporary, minor traffic and noise issues due to construction within the residential streets</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Appropriate construction and traffic management schedule to be adhered to</li></ul>                                                                                                                                                                           | <ul style="list-style-type: none"><li>Impacts may include temporary, minor traffic and noise issues due to construction within the residential streets</li><li>Bioswales are likely to face public opposition due to the maintenance requirements, visual disruption to an otherwise “clean” front lawn and inconvenience of culverts under driveways</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Appropriate construction and traffic management schedule to be adhered to</li></ul> | <ul style="list-style-type: none"><li>Noise and visual impacts associated with construction for the residences and adjacent recreational park</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Construction management plan, including restrictions on hours may reduce inconveniences associated with construction</li></ul>                                                             |
| Effect on public safety                                                     | <ul style="list-style-type: none"><li>No public safety concerns beyond construction period</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Proper signage and safety measures to be set up for construction period</li></ul>                                                                                                                                                                                                                                         | <ul style="list-style-type: none"><li>No public safety concerns beyond construction period</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Proper signage and safety measures to be set up for construction period</li></ul>                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"><li>The cooling trench will not have any affects on public safety once constructed</li><li>During construction there is a potential safety risk due to the connecting public path</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>The construction site should be secured during and after construction hours with warning signs and fencing</li></ul> |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>Impacts are minor and mostly temporary, within the construction period</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"><li>Impacts during construction are temporary and mostly minor</li><li>Long term impacts on residents due to visual impacts and culvert maintenance may be significant</li></ul>                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"><li>No long term social impacts associated with the cooling trench</li><li>Minimal disturbance to the public may occur during construction but the construction time frame will be brief</li></ul>                                                                                                                                                                                                         |
| Economic Considerations                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Capital costs                                                               | <ul style="list-style-type: none"><li>Moderate to high capital cost related to new pipe infrastructure, earthworks and plantings, as well as likely relocation of existing pipe infrastructure</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Proficient SUE investigation prior to design work can minimize unexpected existing pipe/utility interferences</li></ul>                                                                                               | <ul style="list-style-type: none"><li>Moderate to high capital cost related to new pipe infrastructure, earthworks and plantings, as well as likely relocation of existing pipe infrastructure</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Proficient SUE investigation prior to design work can minimize unexpected existing pipe/utility interferences</li></ul>                                                                                                                    | <ul style="list-style-type: none"><li>Low capital cost for a relatively small excavation and materials</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Capital costs can be marginally reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required trench volume)</li></ul>                                                                      |
| Maintenance and operating costs                                             | <ul style="list-style-type: none"><li>Moderate maintenance costs associated with unclogging perforated pipes</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Pre-treatment of stormwater with grassed filter strips can prevent some clogging of perforated pipes</li></ul>                                                                                                                                                                                          | <ul style="list-style-type: none"><li>Low to moderate maintenance costs associated with replacing filter media, unclogging perforated pipes</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Pre-treatment of stormwater with grassed filter strips can prevent some clogging of perforated pipes</li></ul>                                                                                                                                                                                | <ul style="list-style-type: none"><li>Low maintenance cost associated with cleaning out the trench</li><li>Lower maintenance frequency; likely once per year, ideally not requiring access to railway lands</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Maintenance frequency should be as directed by operations manual</li></ul>                                                   |
| Impact on future development and growth                                     | <ul style="list-style-type: none"><li>Retrofit R.O.W. with perforated pipes and soakaway pits may dictate R.O.W. standards for future development</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>On-site control requirements for any future intensification within the watershed would mitigate negative impacts on the LID</li></ul>                                                                                                                              | <ul style="list-style-type: none"><li>Retrofit R.O.W. with bioswales may dictate R.O.W. standards for future development</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Bioswales can enhance the aesthetic appeal of a neighbourhood / development and provide an ‘added value’</li><li>On-site control requirements for any future intensification within the watershed would mitigate negative impacts on the LID</li></ul>                                                           | <ul style="list-style-type: none"><li>No impacts</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                                                                                                                                                                                                                                                |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>Perforated pipes and soakaway pits are a moderate to high capital cost for retrofit and require moderately complex maintenance</li></ul>                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>Bioswales are a moderate to high capital cost for retrofit but may add value to a neighbourhood, depending on general public opinion</li></ul>                                                                                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"><li>A cooling trench is a cost effective alternative to meet temperature criteria</li></ul>                                                                                                                                                                                                                                                                                                                |
| Results of Alternative Evaluation                                           | <ul style="list-style-type: none"><li>This alternative is not preferred because infiltration in R.O.W.s cannot provide the required level of water quality and erosion control.</li><li>Another alternative would need to be implemented in conjunction with infiltration in R.O.W.s in order to meet SWM objectives, making this alternative economically inefficient.</li><li>The construction of infiltration pipes in R.O.W.s will create short term accessibility, visual and noise impacts on residents.</li></ul> | <ul style="list-style-type: none"><li>This alternative is not preferred because bioswales cannot provide the required level of water quality and erosion control.</li><li>Another alternative would need to be implemented in conjunction with bioswales in order to meet SWM objectives, making this alternative economically inefficient.</li><li>The construction and maintenance of bioswales will create short and long term accessibility and visual impacts on residents.</li></ul>                                                    | <ul style="list-style-type: none"><li>This alternative preferred because it is a minimally invasive best management practice for temperature control. A cooling trench is cost effective and requires minimal maintenance.</li><li>Construction can be designed such that it does not affect adult trees.</li></ul>                                                                                                                          |



| Table 1 –Evaluation of Conceptual Design Alternatives for Pond #77 (Offline Wet Pond) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
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| Criteria                                                                              | Alternatives for Pond #77                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                                                                                       | Do Nothing                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Aquatic and Riparian Plantings at Facility                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Underground Storage Tanks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Alternative Description                                                               | <ul style="list-style-type: none"><li>The pond will continue to function as existing</li><li>Pond #77 is an offline existing wet pond with a 43.65 ha minor drainage area and a 49.41 ha major drainage area</li></ul>                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>Plantings to increase density and area of vegetation cover surrounding facility and within facility to provide shade for cooling of detained water</li></ul>                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"><li>Installed in municipal owned lands including parks and the wetland land parcel</li><li>Underground storage tanks will capture and detain stormwater and release over an extended time period</li><li>Infiltration type underground tanks will allow for infiltration during detention period</li><li>May need water quality control prior to infiltrating (if infiltration is proposed)</li></ul>                                                                                                                                                                                                                                                                                                 |
| Location in Treatment Train                                                           | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | End of Pipe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Target SWM Objective(s)                                                               | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Temperature Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Technical Considerations                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Constructability and accessibility                                                    | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"><li>Plantings need to be adaptable to the existing SWM pond</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Plantings enhance temperature control by providing shade</li></ul>                                                                                                                                                                                                                                 | <ul style="list-style-type: none"><li>Footprint may be large and depends on available soil conditions; constructability is moderate to complex due to space restrictions within the pond block</li><li>Requires re-organization of existing outfalls to feed into central underground tank(s) either prior to entering the pond or likely after</li><li>Based on soil mapping, the soil in the drainage area is not ideal for infiltration</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Tanks with infiltration capabilities provide additional benefits for temperature control</li><li>Site specific soil testing is required to confirm suitability of infiltration</li></ul> |
| Ability to meet stormwater management objective(s)                                    | <ul style="list-style-type: none"><li>Does not provide for or meet the stormwater management objectives of the City and/or TRCA, for temperature control</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul>                                                                                                                                                                             | <ul style="list-style-type: none"><li>Shade from plantings will reduce the temperature of stormwater at a facility</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Plantings are better used in conjunction with other cooling methods to achieve adequate temperature control</li></ul>                                                                                                                                                         | <ul style="list-style-type: none"><li>Underground tanks, especially with infiltration capabilities, may be effective for providing temperature control</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Depth below grade can enhance temperature control</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Engineering best practises / Innovative solution                                      | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"><li>Temperature control of stormwater in general is becoming an engineering best management practice in areas with sensitive habitats</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Effects of plantings can be enhanced with other methods such as use of a bottom draw outlet</li></ul>                                                                                                                    | <ul style="list-style-type: none"><li>Underground tanks, including infiltration, are noted as best management practices</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Maintenance of underground tanks is more extensive than at-grade alternatives</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Summary / Recommendations                                                             | <ul style="list-style-type: none"><li>Does not provide for or meet the stormwater management objectives of the City and/or TRCA, for temperature control</li></ul>                                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"><li>Plantings at stormwater management facility are a simple alternative to provide additional temperature controls</li><li>New plantings need to be adaptable to the existing SWM pond</li></ul>                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>Technically feasible, requiring more intrusive maintenance</li><li>Constructability within existing terrain is moderate to complex due to terrain and limited space within the pond block and easement</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Natural Environment                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Impacts to wildlife and vegetation habitats                                           | <ul style="list-style-type: none"><li>The current condition of wildlife and vegetation habitats will not change; however if the lack of temperature control causes future increase of temperature in the receiving watercourse, this could have a negative impact on the future condition of aquatic habitat and wildlife downstream</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul> | <ul style="list-style-type: none"><li>Planting native species can enhance the existing wildlife and vegetation</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul>                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>Would require removal of some vegetation depending on specific location</li><li>Once installed, less intrusive than other alternatives because of location below grade</li><li>May reduce terrestrial habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Restoration plan required if loss of vegetation expected due to construction</li><li>Migratory bird windows to be adhered to for construction</li><li>Conceptual design will minimize the impact on existing trees</li></ul>                                                                                                                                                    |
| Impacts / Improvements based on SAR / ESA                                             | <ul style="list-style-type: none"><li>Existing vegetation provides some benefit to reducing water temperature</li><li>By not implementing temperature controls, receiving waters may have higher temperatures over time and this can negatively impact sensitive species such as Redside Dace</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul>                                        | <ul style="list-style-type: none"><li>Providing additional shade at stormwater facilities reduces stormwater temperature which is a key benefit for SAR habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Effects of plantings can be enhanced with other methods such as use of a bottom draw outlet</li><li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li></ul> | <ul style="list-style-type: none"><li>Underground tanks may decrease water temperature, providing benefits to the identified SAR</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li></ul>                                                                                                                                                                                                                                                                                                                                                                       |
| Summary / Recommendations                                                             | <ul style="list-style-type: none"><li>Existing vegetation of wetland provides some benefit regarding thermal regulation</li><li>Increasing water temperatures decrease water quality and affect the health of aquatic species</li><li>Existing aquatic and terrestrial vegetation in the pond block provide habitat area and will remain in the current condition</li></ul>                                                                                                 | <ul style="list-style-type: none"><li>Plantings at stormwater facilities provide positive impacts on the natural environment (provided they are non-invasive species)</li></ul>                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>Underground tanks are a long-term non-invasive alternative for providing erosion and temperature control</li><li>Existing trees may be retained during conceptual design</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

| Criteria                                                                    | Alternatives for Pond #77                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                             |
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|                                                                             | Do Nothing                                                                                                                                                                                                                                                         | Aquatic and Riparian Plantings at Facility                                                                                                                                                                                                                                                     | Underground Storage Tanks                                                                                                                                                                                                                                                                                                                                                                   |
| Social Impacts                                                              |                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                             |
| Requirement of easements or purchase of private lands                       | N/A                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>Not applicable (unless required in conjunction with stormwater facility construction)</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not applicable</li> </ul>                                   | <ul style="list-style-type: none"> <li>Adequate space is likely for an underground tank; however is space is tight, acquisition of additional lands is not a preferred option</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not required</li> </ul>                                                                                 |
| Impacts to public and private properties due to construction and operations | N/A                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>No impacts to public</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not applicable</li> </ul>                                                                                                    | <ul style="list-style-type: none"> <li>Construction anticipated within easement lands; impacts may include temporary, minor traffic and noise issues due to proximity to residential neighbourhood</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Proper signage and safety measures to be set up for construction period</li> </ul> |
| Effect on public safety                                                     | N/A                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>Vegetation should be suitable for proposed facility and clearly indicate any water’s edge</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Vegetation at facilities must be maintained</li> </ul>  | <ul style="list-style-type: none"> <li>No public safety concerns beyond construction period</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Proper signage and safety measures to be set up for construction period</li> </ul>                                                                                                        |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"> <li>The ‘Do Nothing’ alternative has no social impacts</li> </ul>                                                                                                                                                               | <ul style="list-style-type: none"> <li>No significant social impacts of plantings at stormwater facilities</li> </ul>                                                                                                                                                                          | <ul style="list-style-type: none"> <li>Underground tanks are proposed to be located in public lands, generally not intrusive to the public during or after construction</li> </ul>                                                                                                                                                                                                          |
| Economic Considerations                                                     |                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                             |
| Capital costs                                                               | <ul style="list-style-type: none"> <li>No action may result in greater capital expenses in the future regarding habitat protection</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not applicable</li> </ul> | <ul style="list-style-type: none"> <li>Low capital cost relative to other alternatives</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Costs may vary depending on extents and types of plantings</li> </ul>                             | <ul style="list-style-type: none"> <li>Moderate capital cost related to storage tank infrastructure</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Efficient tank design to minimize capital costs</li> <li>Adequate soils and extend of earthworks will affect capital cost</li> </ul>                                              |
| Maintenance and operating costs                                             | N/A                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>Low maintenance costs with native, sustainable plantings</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Lower maintenance plants will minimize costs of maintenance and/or replanting</li> </ul> | <ul style="list-style-type: none"> <li>Low maintenance costs associated with cleaning out tanks as per operations manual or in event of clogging</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Can prevent clogging with additional pre-treatment techniques</li> </ul>                                                             |
| Impact on future development and growth                                     | N/A                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>No impact on future development</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not applicable</li> </ul>                                                                                         | <ul style="list-style-type: none"> <li>No impact, but underground tanks would likely require expansion if contributing land use was to intensify</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Additional LIDs in the watershed may mitigate further expansion</li> </ul>                                                           |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"> <li>‘Do nothing’ may postpone required works and increase future costs</li> </ul>                                                                                                                                               | <ul style="list-style-type: none"> <li>Plantings at SWM facilities are a low cost alternative for providing temperature control</li> </ul>                                                                                                                                                     | <ul style="list-style-type: none"> <li>Underground tanks can provide moderate capital and maintenance costs for the achievement of temperature control</li> <li>Capital costs can fluctuate based on actual conditions at the specific location chosen at conceptual design</li> </ul>                                                                                                      |
| Results of Alternative Evaluation                                           | <ul style="list-style-type: none"> <li>This alternative is not preferred because the alternative does not meet the stormwater management objectives</li> </ul>                                                                                                     | <ul style="list-style-type: none"> <li>This alternative is preferred because it will improve/maintain existing habitat and vegetation</li> <li>This alternative provides temperature control at a relatively low capital cost.</li> </ul>                                                      | <ul style="list-style-type: none"> <li>This is not a preferred alternative because it is a more costly option and will create more disturbance than the preferred alternatives</li> </ul>                                                                                                                                                                                                   |

| Criteria                                           | Alternatives for Pond #77                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
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|                                                    | Infiltration in Right-of-Ways (R.O.W.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Bioswales                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Cooling Trench                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Alternative Description                            | <ul style="list-style-type: none"><li>Install perforated secondary pipe within existing storm sewer systems to allow for infiltration through linear soakaway pits</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"><li>Construct bioswales within the road right-of-ways within the facility drainage area</li><li>Bioswales to contain native plantings and subdrains</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"><li>Excavation of a trench between the pond control structure maintenance hole and the outlet</li><li>Modification of outlet piping infrastructure to discharge into trench</li><li>Installation of stone material and restoration of ground surface</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                  |
| Location in Treatment Train                        | Conveyance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | End of Pipe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Target SWM Objective(s)                            | Temperature Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Technical Considerations                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Constructability and accessibility                 | <ul style="list-style-type: none"><li>Construction area is extensive and many secondary infiltration pipes would require to be installed to achieve SWM criteria</li><li>Requires coordination with existing infrastructure and utilities</li><li>Based on soil mapping, the soil in the drainage area is not ideal for infiltration</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may be more suited as supplementary water quality / erosion / temperature control measures, where constructability and retrofit are least disruptive to existing infrastructure</li><li>Site specific soil testing is required to confirm suitability of infiltration</li></ul> | <ul style="list-style-type: none"><li>Construction area is extensive and pipe networks are more intricate, requiring coordination with existing infrastructure</li><li>Road right of ways need to be conducive to grading and space criteria for bioswales</li><li>Based on soil mapping, the soil in the drainage area is not ideal for infiltration</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Bioswales may be more suited as supplementary water quality / erosion / temperature control measures, where constructability and retrofit are least disruptive to existing infrastructure</li><li>Site specific soil testing is required to confirm suitability of infiltration</li></ul> | <ul style="list-style-type: none"><li>Feasible construction; accessibility is moderate, between golf course and homes</li><li>Construction footprint is relatively small</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Erosion and sediment control plans required</li></ul>                                                                                                                                                                                                                                                                                                                                                                |
| Ability to meet stormwater management objective(s) | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may are more effective when used within a treatment train to achieve the stormwater objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Additional pre-treatment will enhance the function of the perforated pipes, to reduce clogging</li></ul>                                                                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"><li>Bioswales are more effective when used within a treatment train to achieve the stormwater objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Additional pre-treatment will enhance the function of bioswales, to reduce clogging of the underdrain pipes</li></ul>                                                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>Cooling trenches can be effective in decreasing the temperature of the outlet water</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Thermal mitigation would be best achieved with a combination of LID methods</li></ul>                                                                                                                                                                                                                                                                                                                                                                               |
| Engineering best practises / innovative solution   | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may are innovative solutions within stormwater management</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Enhanced with further use of LIDs such as vegetated filter strips</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"><li>Bioswales are innovative solutions within stormwater management conveyance systems</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Enhanced with further use of LIDs such as vegetated filter strips</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"><li>Cooling trenches are a recent best management practice</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Thermal mitigation can be enhanced overall with LIDs within the contributing watershed</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                 |
| Summary / Recommendations                          | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may are effective as part of a treatment train and where retrofit does not greatly interfere with existing infrastructure</li><li>Due to the poor infiltration in the soil, Infiltration in the R.O.W. is not a preferred option.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"><li>Bioswales are effective as part of a treatment train and where retrofit does not greatly interfere with existing infrastructure</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"><li>Technically feasible with a small construction footprint</li><li>A cooling trench would help with mitigating the temperature impacts of the SWM pond</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Natural Environment                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Impacts to wildlife and vegetation habitats        | <ul style="list-style-type: none"><li>May require removal of some vegetation depending on specific location; likely few impacts to existing wildlife and vegetation habitats</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Areas disturbed during construction will be restored</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>May require removal of some vegetation depending on specific location</li><li>May present phosphorus issues if not properly designed and/or maintained</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Planted bioswales will enhance neighbourhoods with additional vegetated areas</li></ul>                                                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"><li>Existing vegetation in the work area will be cleared</li><li>All affected areas will be restored</li><li>Results in a net neutral effect to terrestrial habitat</li><li>Reduction of temperature released into the downstream cool-water watercourse will improve the native aquatic habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Appropriate erosion and sediment control measures will be undertaken during construction to reduce any negative impacts to the downstream watercourse</li><li>Restoration plans will be developed for surrounding areas impacted by construction</li></ul> |
| Impacts / improvements based on SAR / ESA          | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) may decrease water temperature, providing benefits to the identified SAR</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may be more suited as supplementary water temperature control measures</li></ul>                                                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>Bioswales may decrease water temperature, providing benefits to the identified SAR</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Bioswales may be more suited as supplementary water temperature control measures</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"><li>There are opportunities to improve the habitat quality of the receiving watercourse by reducing the temperature of flows entering the watercourse</li><li>Cooling effects are very beneficial for Redside Dace habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li></ul>                                                                                                                                                                                                     |
| Summary / Recommendations                          | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits present few impact on the</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>Bioswales which are properly designed to avoid phosphorus loading provide positive impact on</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"><li>A cooling trench at the pond outlet is a relatively simple alternative to mitigate</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

| Criteria                                                                    | Alternatives for Pond #77                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
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|                                                                             | Infiltration in Right-of-Ways (R.O.W.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Bioswales                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Cooling Trench                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                             | natural environment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | the natural environment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | temperatures impacts of the wet pond for the achievement of temperature control                                                                                                                                                                                                                                                                                                                                                                                              |
| Social Impacts                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Requirement of easements or purchase of private lands                       | <ul style="list-style-type: none"><li>To be constructed within municipal R.O.W.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"><li>To be constructed within municipal R.O.W.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>Not required</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                                                                                                                                                                                                                                                                              |
| Impacts to public and private properties due to construction and operations | <ul style="list-style-type: none"><li>Impacts may include temporary, minor traffic and noise issues due to construction within the residential streets</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Appropriate construction and traffic management schedule to be adhered to</li></ul>                                                                                                                                                                           | <ul style="list-style-type: none"><li>Impacts may include temporary, minor traffic and noise issues due to construction within the residential streets</li><li>Bioswales are likely to face public opposition due to the maintenance requirements, visual disruption to an otherwise “clean” front lawn and inconvenience of culverts under driveways</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Appropriate construction and traffic management schedule to be adhered to</li></ul> | <ul style="list-style-type: none"><li>Noise and visual impacts associated with construction for the residences and golf course backing onto proposed SWM facility block</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Construction management plan, including restrictions on hours may reduce inconveniences associated with construction</li></ul>                                                                   |
| Effect on public safety                                                     | <ul style="list-style-type: none"><li>No public safety concerns beyond construction period</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Proper signage and safety measures to be set up for construction period</li></ul>                                                                                                                                                                                                                                         | <ul style="list-style-type: none"><li>No public safety concerns beyond construction period</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Proper signage and safety measures to be set up for construction period</li></ul>                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"><li>The cooling trench will not have any affects on public safety once constructed</li><li>During construction there is a potential safety risk due to excavation if a member of the public was to enter the site</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>The construction site should be secured during and after construction hours with warning signs and fencing</li></ul> |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>Impacts are minor and mostly temporary, within the construction period</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"><li>Impacts during construction are temporary and mostly minor</li><li>Long term impacts on residents due to visual impacts and culvert maintenance may be significant</li></ul>                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"><li>No long term social impacts associated with the cooling trench</li><li>Minimal disturbance to the public may occur during construction but the construction time frame will be brief</li></ul>                                                                                                                                                                                                                                         |
| Economic Considerations                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Capital costs                                                               | <ul style="list-style-type: none"><li>Moderate to high capital cost related to new pipe infrastructure, earthworks and plantings, as well as likely relocation of existing pipe infrastructure</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Proficient SUE investigation prior to design work can minimize unexpected existing pipe/utility interferences</li></ul>                                                                                               | <ul style="list-style-type: none"><li>Moderate to high capital cost related to new pipe infrastructure, earthworks and plantings, as well as likely relocation of existing pipe infrastructure</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Proficient SUE investigation prior to design work can minimize unexpected existing pipe/utility interferences</li></ul>                                                                                                                    | <ul style="list-style-type: none"><li>Low capital cost for a relatively small excavation and materials</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Capital costs can be marginally reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required trench volume)</li></ul>                                                                                                      |
| Maintenance and operating costs                                             | <ul style="list-style-type: none"><li>Moderate maintenance costs associated with unclogging perforated pipes</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Pre-treatment of stormwater with grassed filter strips can prevent some clogging of perforated pipes</li></ul>                                                                                                                                                                                          | <ul style="list-style-type: none"><li>Low to moderate maintenance costs associated with replacing filter media, unclogging perforated pipes</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Pre-treatment of stormwater with grassed filter strips can prevent some clogging of perforated pipes</li></ul>                                                                                                                                                                                | <ul style="list-style-type: none"><li>Low maintenance cost associated with cleaning out the trench</li><li>Lower maintenance frequency; likely once per year, ideally not requiring access to railway lands</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Maintenance frequency should be as directed by operations manual</li></ul>                                                                                   |
| Impact on future development and growth                                     | <ul style="list-style-type: none"><li>Retrofit R.O.W. with perforated pipes and soakaway pits may dictate R.O.W. standards for future development</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>On-site control requirements for any future intensification within the watershed would mitigate negative impacts on the LID</li></ul>                                                                                                                              | <ul style="list-style-type: none"><li>Retrofit R.O.W. with bioswales may dictate R.O.W. standards for future development</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Bioswales can enhance the aesthetic appeal of a neighbourhood / development and provide an ‘added value’</li><li>On-site control requirements for any future intensification within the watershed would mitigate negative impacts on the LID</li></ul>                                                           | <ul style="list-style-type: none"><li>No impacts</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                                                                                                                                                                                                                                                                                |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>Perforated pipes and soakaway pits are a moderate to high capital cost for retrofit and require moderately complex maintenance</li></ul>                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>Bioswales are a moderate to high capital cost for retrofit but may add value to a neighbourhood, depending on general public opinion</li></ul>                                                                                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"><li>A cooling trench is a cost effective alternative to meet temperature criteria</li></ul>                                                                                                                                                                                                                                                                                                                                                |
| Results of Alternative Evaluation                                           | <ul style="list-style-type: none"><li>This alternative is not preferred because infiltration in R.O.W.s cannot provide the required level of water quality and erosion control.</li><li>Another alternative would need to be implemented in conjunction with infiltration in R.O.W.s in order to meet SWM objectives, making this alternative economically inefficient.</li><li>The construction of infiltration pipes in R.O.W.s will create short term accessibility, visual and noise impacts on residents.</li></ul> | <ul style="list-style-type: none"><li>This alternative is not preferred because bioswales cannot provide the required level of water quality and erosion control.</li><li>Another alternative would need to be implemented in conjunction with bioswales in order to meet SWM objectives, making this alternative economically inefficient.</li><li>The construction and maintenance of bioswales will create short and long term accessibility and visual impacts on residents.</li></ul>                                                    | <ul style="list-style-type: none"><li>This alternative is preferred because it is a minimally invasive best management practice for temperature control. A cooling trench is cost effective and requires minimal maintenance.</li><li>Construction can be designed such that it does not affect adult trees and can be restored such that recreational park land is available.</li></ul>                                                                                     |



| Table 1 -Evaluation of Conceptual Design Alternatives for Uncontrolled Outlet #8 (Uncontrolled Area) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
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| Criteria                                                                                             | Alternatives for Uncontrolled Outlet #8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|                                                                                                      | Do Nothing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Oil-Grit Separators (OGS)                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Construct Water Quality Control Pond                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Alternative Description                                                                              | <ul style="list-style-type: none"><li>Stormwater runoff from the 10.0 ha minor drainage area will continue to be released into the receiving watercourse uncontrolled</li></ul>                                                                                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"><li>One (1) unit connected to the minor system prior to final control and outfall</li></ul>                                                                                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"><li>Loss of current land use including clearing of vegetation</li><li>Significant earthworks operations</li><li>Remove and replace section of sewer and outlet infrastructure</li><li>Provision of wet habitat area adjacent to receiving watercourse</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Location in Treatment Train                                                                          | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | End of Pipe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Target SWM Objective(s)                                                                              | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Quality Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Technical Considerations                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Constructability and accessibility                                                                   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>Location is accessible as OGS unit could be installed upstream of the outfall at a manhole within the municipal roadway; construction area is relatively small</li><li>Construction considerations include traffic interruptions and short term road closures</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Traffic management plans may reduce inconveniences associated with construction</li></ul> | <ul style="list-style-type: none"><li>Site is accessible</li><li>Existing changes in elevation adjacent to the residential area could be incorporated as a pond berm</li><li>There is limited space available to create staging area near the construction area. If necessary, it may be placed inside of the construction area.</li><li>Cannot build new facility in available land as it is not in accordance with TRCA policy</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>The easement along Highway 7 may be used as a construction staging area, if required</li></ul>                                                                                                                                                                                                                                                                                                                                                                          |
| Ability to meet stormwater management objective(s)                                                   | <ul style="list-style-type: none"><li>Does not provide for or meet the stormwater management objectives of the City and/or TRCA, for water quality, erosion or quantity control</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul>                                                                                                                                                                                                                   | <ul style="list-style-type: none"><li>OGS units may be able to provide all required stormwater quality objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Pre-treatment of stormwater runoff with LIDs will enhance the performance of the OGS</li></ul>                                                                                                                                                                              | <ul style="list-style-type: none"><li>A wet pond facility would be capable of fully meeting the requirements for quality control</li><li>Cannot build new facility in available land as it is not in accordance with TRCA policy</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>A wet pond facility for quality control could be constructed to include erosion control volumes as well within a single footprint reducing disturbance to nearby landowners</li><li>Quality control can be enhanced with LIDs that infiltrate runoff within the drainage area</li></ul>                                                                                                                                                                                                                                                                                                                                                                                 |
| Engineering best practises / innovative solution                                                     | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>OGS and similar units are noted as best management practices</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Pre-treatment of stormwater runoff with LIDs will enhance the performance of the OGS</li><li>Filtration cartridge options may be used rather than traditional OGS to target more specific pollutants</li></ul>                                                                             | <ul style="list-style-type: none"><li>Typically more traditional SWM approach</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Quality control can be enhanced with LIDs that infiltrate runoff within the drainage area</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Summary / Recommendations                                                                            | <ul style="list-style-type: none"><li>Does not provide for or meet the stormwater management objectives of the City and/or TRCA, for water quality, erosion or quantity control</li></ul>                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>OGS can be effective, low-space option to provide water quality control</li></ul>                                                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>Technically feasible</li><li>Cannot build new facility in available land as it is not in accordance with TRCA policy</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Natural Environment                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Impacts to wildlife and vegetation habitats                                                          | <ul style="list-style-type: none"><li>The current condition of wildlife and vegetation habitats will not change; however if the release of uncontrolled stormwater into the receiving watercourse causes future erosion in the watercourse or impacts the quality of the water in the watercourse, this could have a negative impact on the future condition of wildlife and vegetation habitats.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul> | <ul style="list-style-type: none"><li>OGS does not physically interfere with the existing outlet or impact the surrounding forested area and improves water quality prior to discharge to the watercourse</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation required</li></ul>                                                                                                                                                    | <ul style="list-style-type: none"><li>Some of existing vegetation will be cleared, which includes adult trees</li><li>Results in a loss of terrestrial habitat but a gain in aquatic habitat for migrating birds and terrestrial animals</li><li>There are opportunities to improve the habitat quality of the receiving watercourse by reducing the sediment loading and potential contaminate exposure of the receiving watercourse</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Restoration plans will be developed to restore the surrounding areas impacted by construction</li><li>Riparian and aquatic vegetation can be planted on the berms and within the wet pond facility which will also aid in reducing the temperature impacts of the surface detention of runoff</li><li>Stringent construction practices can be implemented to reduce the possibility of introducing invasive species to the ecosystem during construction</li></ul> |
| Impacts / improvements based on SAR / ESA                                                            | <ul style="list-style-type: none"><li>Existing vegetation provides some benefit to reducing water temperature</li><li>By not implementing temperature controls, receiving waters may have higher temperatures over time and this can negatively impact sensitive species such as</li></ul>                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>Meeting water quality criteria will improve water quality of downstream receiving waters</li><li>Little to no effect on temperature mitigation</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Use of OGS can be enhanced with pre-</li></ul>                                                                                                                                                           | <ul style="list-style-type: none"><li>There are opportunities to improve the habitat quality of the receiving watercourse by reducing the sediment loading of the watercourse</li><li>The receiving watercourse has been identified as Redside Dace habitat</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

| Criteria                                                                           | Alternatives for Uncontrolled Outlet #8                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                    | Do Nothing                                                                                                                                                                                                                                                                                                                                                                  | Oil-Grit Separators (OGS)                                                                                                                                                                                                                                                                                                                                                                                                                       | Construct Water Quality Control Pond                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                    | Redside Dace<br><b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul>                                                                                                                                                                                                                                | treatment using LIDs throughout minor system watershed                                                                                                                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"><li>Wet ponds can provide reduction of stormwater temperature with the inclusion of a bottom draw outlet and shading from vegetation</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li><li>Stringent construction practices can be implemented to reduce the possibility of introducing invasive species to the ecosystem during construction</li></ul> |
| <b>Summary / Recommendations</b>                                                   | <ul style="list-style-type: none"><li>Existing vegetation of wetland provides some benefit regarding thermal regulation</li><li>Increasing water temperatures decrease water quality and affect the health of aquatic species</li><li>Existing aquatic and terrestrial vegetation in the pond block provide habitat area and will remain in the current condition</li></ul> | <ul style="list-style-type: none"><li>OGS offers improvements to water quality</li><li>Used in conjunction with LIDs, OGS can improve water conditions for SAR</li></ul>                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"><li>A wet pond can be beneficial to downstream receiving waters but will alter any existing habitat within the construction area</li><li>Tree loss is probable within the site</li></ul>                                                                                                                                                                                                                                                                                                                                         |
| Social Impacts                                                                     |                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Requirement of easements or purchase of private lands</b>                       | N/A                                                                                                                                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"><li>Not required; preference to install and maintain OGS within municipal R.O.W., where maintenance is easily accessible</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                                                                                                                                         | <ul style="list-style-type: none"><li>Cannot build new facility in available land as it is not in accordance with TRCA policy</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Land requirements would be confirmed through conceptual design</li></ul>                                                                                                                                                                                                                                                         |
| <b>Impacts to public and private properties due to construction and operations</b> | N/A                                                                                                                                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"><li>Roadway interference and/or short-term closure would be expected for the installation of OGS units</li><li>Temporary interference to be expected on roadways during maintenance (approximately once a year)</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Traffic management plans may reduce inconveniences associated with construction</li></ul> | <ul style="list-style-type: none"><li>Noise and visual impacts associated with construction for the residences backing onto proposed SWM facility block</li><li>A construction staging area may need to be set up within the existing Highway 7 easement to avoid disturbance to residential area</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Construction management plan, including restrictions on hours</li></ul>                                                                                      |
| <b>Effect on public safety</b>                                                     | N/A                                                                                                                                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"><li>Installed OGS does not pose threats to public safety</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul>                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>By building to the required side slope and depth criteria, the wet pond facility should not pose a threat to public safety</li><li>There are no trails through this green space and public access is very limited, thereby reducing the exposure of public to the facility</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Flattened slopes, warning signs, and fencing (if required) can provide measures of safety</li></ul>                                           |
| <b>Summary / Recommendations</b>                                                   | <ul style="list-style-type: none"><li>The ‘Do Nothing’ alternative has no social impacts</li></ul>                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"><li>OGS presents few and short-term impacts associated with installation and maintenance</li></ul>                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"><li>Construction of a wet pond facility would be a longer-term construction project with potential noise, traffic and visual impacts</li><li>New facility in available land not feasible as it is not in accordance with TRCA policy</li></ul>                                                                                                                                                                                                                                                                                   |
| Economic Considerations                                                            |                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Capital costs</b>                                                               | <ul style="list-style-type: none"><li>No action may result in greater capital expenses in the future</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                                                                                                                           | <ul style="list-style-type: none"><li>Relatively low capital cost for installation of one (1) unit and associated infrastructure works</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Capital cost of OGS units can be reduced if stormwater is pre-treated with LIDs (thus scaling down required OGS size)</li></ul>                                                                      | <ul style="list-style-type: none"><li>Moderate capital cost for earthworks, grading, infrastructure components and permits</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Capital costs can be marginally reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required quality control volumes and footprint)</li></ul>                                                                                                                                                |
| <b>Maintenance and operating costs</b>                                             | N/A                                                                                                                                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"><li>Fairly low maintenance cost and frequency; approximately annually</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Maintenance frequency of OGS units should not decrease with increased pre-treatment</li></ul>                                                                                                                                       | <ul style="list-style-type: none"><li>Low to moderate maintenance cost and frequency; likely seasonally</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Maintenance frequency should be as directed by operations manual</li><li>Maintenance frequency can be reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required quality control volume)</li></ul>                                                                                                            |
| <b>Impact on future development and growth</b>                                     | N/A                                                                                                                                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"><li>Size of OGS is static once installed and would require upgrading if a larger drainage area is directed to it (in order to meet water quality criteria)</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Additional OGS units may be installed in the future to correspond with growth</li></ul>                                                        | <ul style="list-style-type: none"><li>No impact, but detention facility would require expansion if contributing land use was to intensify</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>On-site control requirements for any intensified development within the facility’s watershed would mitigate further expansion</li></ul>                                                                                                                                                                              |
| <b>Summary /</b>                                                                   | <ul style="list-style-type: none"><li>‘Do nothing’ may postpone required works</li></ul>                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"><li>Installation of OGS units is a low to medium</li></ul>                                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"><li>Construction of a wet pond facility would</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

| Criteria                          | Alternatives for Uncontrolled Outlet #8                                                                                                                      |                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                      |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                   | Do Nothing                                                                                                                                                   | Oil-Grit Separators (OGS)                                                                                                                                                                                                                                       | Construct Water Quality Control Pond                                                                                                                                                                                                                                                                                                 |
| Recommendations                   | and increase future costs                                                                                                                                    | cost solution for achievement of most of the required SWM criteria                                                                                                                                                                                              | present moderate capital costs for achievement of quality control                                                                                                                                                                                                                                                                    |
| Results of Alternative Evaluation | <ul style="list-style-type: none"><li>This alternative is not preferred because the alternative does not meet the stormwater management objectives</li></ul> | <ul style="list-style-type: none"><li>This is a preferred alternative due to the lower cost, small disturbance area and ability to provide full quality control</li><li>This alternative can be implemented with little to no loss of existing trees.</li></ul> | <ul style="list-style-type: none"><li>Retaining existing trees is a high priority for the City of Markham, however tree loss is probable for construction of this alternative.</li><li>Cannot build new facility in available land as it is not in accordance with TRCA policy. Therefore, this is not a preferred option.</li></ul> |

| Criteria                                           | Alternatives for Uncontrolled Outlet #8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                    | Bottom Draw Outlet in a Wet Pond                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Construct Extended Detention Facility                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Underground Storage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Alternative Description                            | <ul style="list-style-type: none"><li>Construct a bottom draw outlet to reduce temperatures of discharged water.</li><li>Only applicable if the wetland is converted into a wet pond</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"><li>Significant earthworks</li><li>Remove and replace section of existing sewer and outlet infrastructure</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"><li>Installed at pond block location</li><li>Underground storage tanks will capture and detain stormwater and release over an extended time period</li><li>Infiltration type underground tanks will allow for infiltration during detention period</li><li>May need water quality control prior to infiltrating (if proposed)</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Location in Treatment Train                        | End of Pipe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Target SWM Objectives                              | Temperature Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Erosion Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Erosion and Temperature Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Technical Considerations                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Constructability and accessibility                 | <ul style="list-style-type: none"><li>Constructability is simple, pending adequate depth of the wet pond</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Greater depth enhances the thermal mitigation function of the bottom draw outlet</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>Site is accessible</li><li>Existing changes in elevation adjacent to the residential area could be incorporated as a pond berm</li><li>Site area may be tight to incorporate construction staging area</li><li>Cannot build new facility in available land as it is not in accordance with TRCA policy.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>The easement along Highway 7 may be used as a construction staging area, if required</li></ul>                                                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"><li>Footprint may be large but is constructible within municipally owned lands; constructability is low to moderate</li><li>Still allows for use of land at-grade</li><li>May require re-organization of existing outlets to feed into central underground tanks</li><li>Based on soil mapping, the soil in the western and central area of the drainage area is not ideal for infiltration. Soil in the eastern section of the drainage area and the pond block is conducive to infiltration.</li><li>Cannot build new facility in available land as it is not in accordance with TRCA policy.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Tanks with infiltration capabilities provide additional benefits to erosion and temperature control</li><li>Constructability would likely be increased by incorporating several underground tanks rather than one central system</li></ul> |
| Ability to meet stormwater management objective(s) | <ul style="list-style-type: none"><li>Bottom draw outlets can be effective in decreasing the temperature of the outlet water</li><li>Temperature mitigation not needed as stormwater is not stored, which would cause warming.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Thermal mitigation would be best achieved with a combination of LID methods</li></ul>                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>An extended detention facility would be capable of fully meeting the requirements for erosion control detention</li><li>Cannot build new facility in available land as it is not in accordance with TRCA policy.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>An extended detention facility for erosion control could be sized to provide quality and erosion control within a single pond block reducing construction footprints and disturbance to nearby landowners</li><li>Erosion control can be enhanced with LIDs that detain and/or infiltrate runoff within the drainage area</li><li>Extended detention facilities could be enhanced with outlets which consider thermal mitigation techniques, to improve water quality of the diverted flows</li></ul> | <ul style="list-style-type: none"><li>Underground tanks, especially with infiltration capabilities, are effective for providing quality and erosion control</li><li>Cannot build new facility in available land as it is not in accordance with TRCA policy.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Longer detention times can enhance the erosion control</li><li>Infiltration type underground tanks will allow for infiltration during detention period</li><li>May need water quality control prior to infiltrating (if proposed)</li></ul>                                                                                                                                                                                                                                                                                                                                                                     |
| Engineering best practises / innovative solution   | <ul style="list-style-type: none"><li>Bottom draw outlets in combination with cooling trenches are recent best management practices</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Thermal mitigation can be enhanced overall with LIDs within the contributing watershed</li></ul>                                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>Typically more traditional SWM approach</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Erosion control can be enhanced with LIDs that detain and/or infiltrate runoff within the drainage area</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"><li>Underground tanks, including infiltration, are noted as best management practices</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Maintenance of underground tanks is more extensive than at-grade alternatives</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Summary / Recommendations                          | <ul style="list-style-type: none"><li>Temperature mitigation not needed as stormwater is not stored, which would cause warming.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"><li>Technically feasible</li><li>Cannot build new facility in available land as it is not in accordance with TRCA policy.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"><li>Technically feasible, requiring more intrusive maintenance</li><li>Cannot build new facility in available land as it is not in accordance with TRCA policy.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Natural Environment                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Impacts to wildlife and vegetation habitats        | <ul style="list-style-type: none"><li>Existing vegetation in the work area will be cleared</li><li>All affected areas will be restored and can be planted to replace removed vegetation</li><li>Results in a net neutral effect to terrestrial habitat</li><li>Reduction of temperature released into the downstream cool-water watercourse will improve the native aquatic habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Appropriate erosion and sediment control measures will be undertaken during construction to reduce any negative impacts to the downstream watercourse</li><li>Restoration plans will be developed to</li></ul> | <ul style="list-style-type: none"><li>Existing vegetation in the work area will be cleared</li><li>Results in a loss of terrestrial habitat</li><li>There are opportunities to improve the habitat quality of the receiving watercourse by reducing the peak flows entering the watercourse and thereby reducing erosion</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Restoration plans will be developed to restore the surrounding areas impacted by construction</li><li>Vegetation can be planted on the berms of the extended detention facility which will also aid in reducing the temperature impacts of the surface detention of runoff</li></ul>                                                                                                                                                | <ul style="list-style-type: none"><li>May require removal of some vegetation depending on specific location</li><li>Once installed, less intrusive than other alternatives because of location below grade</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Restoration plan required if loss of vegetation expected due to construction</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |



| Criteria                                                                    | Alternatives for Uncontrolled Outlet #8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                             | Bottom Draw Outlet in a Wet Pond                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Construct Extended Detention Facility                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Underground Storage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                                                                             | restore the surrounding areas impacted by construction                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"> <li>Stringent construction practices can be implemented to reduce the possibility of introducing invasive species to the ecosystem during construction</li> <li>Construction site will be designed to minimize vegetation and habitat loss, and avoid the clearing of adult trees</li> </ul>                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Impacts / improvements based on SAR / ESA                                   | <ul style="list-style-type: none"> <li>There are opportunities to improve the habitat quality of the receiving watercourse by reducing the temperature of flows entering the watercourse</li> <li>Cooling effects are very beneficial for Redside Dace habitat</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Effects on fish could be mitigated with appropriate screens and outflow velocities</li> <li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li> </ul> | <ul style="list-style-type: none"> <li>There are opportunities to improve the habitat quality of the receiving watercourse by reducing the erosion and thereby sediment loading of the receiving watercourse</li> <li>The receiving watercourse has been identified to be Redside Dace habitat</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li> <li>Stringent construction practices can be implemented to reduce the possibility of introducing invasive species to the ecosystem during construction</li> </ul> | <ul style="list-style-type: none"> <li>Underground tanks may improve the habitat quality of the receiving watercourse by reducing the erosion and thereby sediment loading of the receiving watercourse</li> <li>The receiving watercourse has been identified to be Redside Dace habitat</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li> <li>Stringent construction practices can be implemented to reduce the possibility of introducing invasive species to the ecosystem during construction</li> </ul> |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"> <li>A cooling trench at the pond outlet is a relatively simple alternative to mitigate temperatures impacts of the wet pond for the achievement of temperature control</li> </ul>                                                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"> <li>An extended detention facility can be beneficial to downstream receiving waters but will alter any existing habitat within the construction area</li> <li>Adult trees may be retained</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>Underground tanks are a long-term non-invasive alternative for providing quality and erosion control</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Social Impacts                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Requirement of easements or purchase of private lands                       | <ul style="list-style-type: none"> <li>Sufficient space is available within the pond block</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not applicable</li> </ul>                                                                                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"> <li>Likely not required for the construction and maintenance of an extended detention facility for UC #8</li> <li>Cannot build new facility in available land as it is not in accordance with TRCA policy.</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Land requirements would be confirmed through conceptual design</li> </ul>                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"> <li>Likely not required for the construction and maintenance of an underground storage tank facility for UC #8</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Land requirements would be confirmed through conceptual design</li> </ul>                                                                                                                                                                                                                                                                                                                                                         |
| Impacts to public and private properties due to construction and operations | <ul style="list-style-type: none"> <li>Noise and visual impacts associated with construction for the residences backing onto proposed SWM facility block</li> <li>A construction staging area may need to be set up within the existing Highway 7 easement to avoid impacts to residential properties during construction</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Construction management plan, including restrictions on hours may reduce inconveniences associated with construction</li> </ul>                                | <ul style="list-style-type: none"> <li>Noise and visual impacts associated with construction for the residences backing onto proposed SWM facility block</li> <li>A construction staging area may need to be set up within the existing Highway 7 easement to avoid impacts to residential properties during construction</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Construction management plan, including restrictions on hours</li> </ul>                                                                                                                                                                                       | <ul style="list-style-type: none"> <li>Noise and visual impacts associated with construction for the residences backing onto proposed SWM facility block</li> <li>A construction staging area may need to be set up within the existing Highway 7 easement to avoid impacts to residential properties during construction</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Construction management plan, including restrictions on hours</li> </ul>                                                                                                                                                                                  |
| Effect on public safety                                                     | <ul style="list-style-type: none"> <li>The bottom draw outlet will not impact public safety</li> <li>There are no trails through this green space and public access is very limited, thereby reducing the exposure of public to the facility</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>The construction site should be secured during and after construction hours with warning signs and fencing</li> </ul>                                                                                                                       | <ul style="list-style-type: none"> <li>By building to the required side slope and depth criteria, the dry pond facility should not pose a threat to public safety</li> <li>There are no trails through this green space and public access is very limited, thereby reducing the exposure of public to the facility</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Adequate slopes, warning signs, and fencing (if required) can provide measures of safety</li> </ul>                                                                                                                                                                   | <ul style="list-style-type: none"> <li>No public safety concerns beyond construction period</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Proper signage and safety measures to be set up for construction period</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                      |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"> <li>There are no long term social impacts associated with the bottom draw outlet</li> <li>Minimal disturbance to the public may occur during construction but the construction time frame will be brief</li> </ul>                                                                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"> <li>Construction of an extended detention facility would be a longer-term construction project with potential noise, traffic and visual impacts</li> <li>Cannot build new facility in available land as it is not in accordance with TRCA policy.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>Underground tanks are likely proposed to be located in the pond block; not intrusive to the public after construction</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Economic Considerations                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Capital costs                                                               | <ul style="list-style-type: none"> <li>Low capital cost for a relatively small excavation and materials</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Bottom draw outlet cost not likely to fluctuate much pending other design decisions on this site</li> </ul>                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"> <li>Moderate capital cost for earthworks, grading, infrastructure components, permits</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Capital costs can be marginally reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required detention volumes)</li> </ul>                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"> <li>Moderate capital cost related to storage tank infrastructure</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Efficient tank design to minimize capital costs</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Maintenance and operating costs                                             | <ul style="list-style-type: none"> <li>Low maintenance cost associated with cleaning out the bottom draw outlet if clogged</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Maintenance frequency should be as directed by operations manual</li> </ul>                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Lower maintenance cost and frequency; likely every few years</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Maintenance frequency should be as directed by operations manual</li> <li>Maintenance frequency can be reduced by providing pre-treatment for sediment removal</li> </ul>                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"> <li>Low maintenance costs associated with cleaning out tanks as per operations manual or in event of clogging</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Can prevent clogging with additional pre-treatment techniques</li> </ul>                                                                                                                                                                                                                                                                                                                                                           |
| Impact on future development and growth                                     | <ul style="list-style-type: none"> <li>No impacts; may required upgrade or adjustment if contributing watershed characteristics change</li> </ul> <b>Mitigation/Compensation/Enhancement</b>                                                                                                                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>No impact, but extended detention facility would require expansion if contributing land use was to intensify</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"> <li>No impact, but underground tanks would require expansion if contributing land use was to intensify</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

| Criteria                                 | Alternatives for Uncontrolled Outlet #8                                                                                                        |                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                          | Bottom Draw Outlet in a Wet Pond                                                                                                               | Construct Extended Detention Facility                                                                                                                                                                                               | Underground Storage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                                          | <b>Measures</b> <ul style="list-style-type: none"><li>▪ Not applicable</li></ul>                                                               | <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ On-site control requirements for any intensified development within the facility's watershed would mitigate further expansion</li></ul> | <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ On-site control requirements for any future intensification within the watershed would mitigate further expansion</li></ul>                                                                                                                                                                                                                                                                                                             |
| <b>Summary / Recommendations</b>         | <ul style="list-style-type: none"><li>▪ A bottom draw outlet is a cost effective alternative to meet temperature criteria</li></ul>            | <ul style="list-style-type: none"><li>▪ Construction of an extended detention facility would present moderate capital costs for achievement of quantity control</li></ul>                                                           | <ul style="list-style-type: none"><li>▪ Underground tanks provide moderate capital and maintenance costs for the achievement of quality and erosion control</li><li>▪ A larger footprint may be required with the use of this alternative</li></ul>                                                                                                                                                                                                                                                                                 |
| <b>Results of Alternative Evaluation</b> | <ul style="list-style-type: none"><li>▪ This alternative is not preferred because a wet pond is not a preferred option for this site</li></ul> | <ul style="list-style-type: none"><li>▪ Cannot build new facility in available land as it is not in accordance with TRCA policy. Therefore this is not a preferred alternative</li></ul>                                            | <ul style="list-style-type: none"><li>▪ This is not a preferred alternative be cause constructing an underground storage tank is a more costly method to achieve quantity and erosion control when compared to constructing a pond.</li><li>▪ This alternative would have more constructability challenges than other alternatives that achieve the same SWM objectives.</li><li>▪ Cannot build new facility in available land as it is not in accordance with TRCA policy. Therefore this is not a preferred alternative</li></ul> |

| Criteria                                           | Alternatives for Uncontrolled Outlet #8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                    | Bioswales                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Infiltration in Right-of-Ways (R.O.W.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Cooling Trench                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Alternative Description                            | <ul style="list-style-type: none"><li>Construct bioswales within the road right-of-ways within the facility drainage area</li><li>Bioswales to contain native plantings and subdrains</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"><li>Install perforated secondary pipe within existing storm sewer systems to allow for infiltration through linear soakaway pits</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"><li>Excavation of a trench between the pond control structure maintenance hole and the outlet</li><li>Modification of outlet piping infrastructure to discharge into trench</li><li>Installation of stone material and restoration of ground surface</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Location in Treatment Train                        | Conveyance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | End of Pipe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Target SWM Objective(s)                            | Quality, Erosion and Temperature Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Temperature Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Technical Considerations                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Constructability and accessibility                 | <ul style="list-style-type: none"><li>Construction area is extensive and pipe networks are more intricate, requiring coordination with existing infrastructure</li><li>Road right of ways need to be conducive to grading and space criteria for bioswales</li><li>Based on soil mapping, the soil in the western and central area of the drainage area is not ideal for infiltration. Soil in the eastern section of the drainage area and the pond block is conducive to infiltration.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Bioswales may be more suited as supplementary water quality / erosion / temperature control measures, where constructability and retrofit are least disruptive to existing infrastructure</li><li>Site specific soil testing is required to confirm suitability of infiltration measures</li></ul> | <ul style="list-style-type: none"><li>Construction area is extensive and many secondary infiltration pipes would require to be installed to achieve SWM criteria</li><li>Requires coordination with existing infrastructure and utilities</li><li>Based on soil mapping, the soil in the western and central area of the drainage area is not ideal for infiltration. Soil in the eastern section of the drainage area and the pond block is conducive to infiltration.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may be more suited as supplementary water quality / erosion / temperature control measures, where constructability and retrofit are least disruptive to existing infrastructure</li><li>Site specific soil testing is required to confirm suitability of infiltration measures</li></ul> | <ul style="list-style-type: none"><li>Feasible construction; site is accessible</li><li>Construction footprint is relatively small</li><li>Cannot build new facility in available land as it is not in accordance with TRCA policy.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Erosion and sediment control plans required</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Ability to meet stormwater management objective(s) | <ul style="list-style-type: none"><li>Bioswales are more effective when used within a treatment train to achieve the stormwater objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Additional pre-treatment will enhance the function of bioswales, to reduce clogging of the underdrain pipes</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may are more effective when used within a treatment train to achieve the stormwater objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Additional pre-treatment will enhance the function of the perforated pipes, to reduce clogging</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"><li>Cooling trenches can be effective in decreasing the temperature of the outlet water</li><li>Cannot build new facility in available land as it is not in accordance with TRCA policy.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Thermal mitigation would be best achieved with a combination of LID methods</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                        |
| Engineering best practises / innovative solution   | <ul style="list-style-type: none"><li>Bioswales are innovative solutions within stormwater management conveyance systems</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Enhanced with further use of LIDs such as vegetated filter strips</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may are innovative solutions within stormwater management</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Enhanced with further use of LIDs such as vegetated filter strips</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>Cooling trenches are a recent best management practice</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Thermal mitigation can be enhanced overall with LIDs within the contributing watershed</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Summary / Recommendations                          | <ul style="list-style-type: none"><li>Bioswales are effective as part of a treatment train and where retrofit does not greatly interfere with existing infrastructure</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may are effective as part of a treatment train and where retrofit does not greatly interfere with existing infrastructure</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"><li>Technically feasible with a small construction footprint</li><li>Cannot build new facility in available land as it is not in accordance with TRCA policy.</li><li>A cooling trench would help with mitigating the temperature impacts of the SWM pond</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Natural Environment                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Impacts to wildlife and vegetation habitats        | <ul style="list-style-type: none"><li>May require removal of some vegetation depending on specific location</li><li>May present phosphorus issues if not properly designed and/or maintained</li><li>Bioswales may decrease water temperature, providing benefits to the aquatic habitat of the receiving watercourse</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Planted bioswales will enhance neighbourhoods with additional vegetated areas</li></ul>                                                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>May require removal of some vegetation depending on specific location; likely few impacts to existing wildlife and vegetation habitats</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Areas disturbed during construction will be restored</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"><li>Existing vegetation in the work area will be cleared</li><li>All affected areas will be restored</li><li>Results in a net neutral effect to terrestrial habitat</li><li>Reduction of temperature released into the downstream cool-water watercourse will improve the native aquatic habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Appropriate erosion and sediment control measures will be undertaken during construction to reduce any negative impacts to the downstream watercourse</li><li>Restoration plans will be developed for surrounding areas impacted by construction</li><li>Construction site will be designed to minimize vegetation and habitat loss, and avoid the clearing of adult trees</li></ul> |
| Impacts / improvements based on SAR / ESA          | <ul style="list-style-type: none"><li>Bioswales may decrease water temperature, providing benefits to the aquatic habitat of the receiving watercourse</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Bioswales may be more suited as supplementary water temperature control measures</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>Underground tanks may decrease water temperature, providing benefits to the aquatic habitat of the receiving watercourse</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may be more suited as supplementary water temperature control</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>There are opportunities to improve the habitat quality of the receiving watercourse by reducing the temperature of flows entering the watercourse</li><li>Cooling effects are very beneficial for Redside Dace habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

| Criteria                                                                    | Alternatives for Uncontrolled Outlet #8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                             | Bioswales                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Infiltration in Right-of-Ways (R.O.W.)                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Cooling Trench                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"> <li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li> </ul>                                                                                                                                                                                                                                                                                                              |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"> <li>Bioswales which are properly designed to avoid phosphorus loading provide positive impact on the natural environment</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"> <li>Perforated pipes (exfiltration pipes) and soakaway pits present few impact on the natural environment</li> </ul>                                                                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"> <li>A cooling trench at the pond outlet is a relatively simple alternative to mitigate temperatures impacts of the wet pond for the achievement of temperature control</li> <li>Adult trees may be retained</li> </ul>                                                                                                                                                                                                                         |
| Social Impacts                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Requirement of easements or purchase of private lands                       | <ul style="list-style-type: none"> <li>To be constructed within municipal R.O.W.</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not applicable</li> </ul>                                                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>To be constructed within municipal R.O.W.</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not applicable</li> </ul>                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"> <li>Cannot build new facility in available land as it is not in accordance with TRCA policy.</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not applicable</li> </ul>                                                                                                                                                                                                                   |
| Impacts to public and private properties due to construction and operations | <ul style="list-style-type: none"> <li>Impacts may include temporary, minor traffic and noise issues and significant visual nuisances due to construction within the residential streets</li> <li>Bioswales are likely to face public opposition due to the maintenance requirements, visual disruption to an otherwise “clean” front lawn and inconvenience of culverts under driveways</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Appropriate construction and traffic management schedule to be adhered to</li> </ul> | <ul style="list-style-type: none"> <li>Impacts may include temporary, minor traffic and noise issues due to construction within the residential streets</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Appropriate construction and traffic management schedule to be adhered to</li> </ul>                                                                                                                                               | <ul style="list-style-type: none"> <li>Noise and visual impacts associated with construction for the residences backing onto proposed SWM facility block</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Construction management plan, including restrictions on hours may reduce inconveniences associated with construction</li> </ul>                                                                                    |
| Effect on public safety                                                     | <ul style="list-style-type: none"> <li>No public safety concerns beyond construction period</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Proper signage and safety measures to be set up for construction period</li> </ul>                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>No public safety concerns beyond construction period</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Proper signage and safety measures to be set up for construction period</li> </ul>                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>The cooling trench will not have any affects on public safety once constructed</li> <li>During construction there is a potential safety risk due to excavation if a member of the public was to enter the site</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>The construction site should be secured during and after construction hours with warning signs and fencing</li> </ul> |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"> <li>Impacts during construction are temporary and mostly minor</li> <li>Long term impacts on residents due to visual impacts and culvert maintenance are significant</li> </ul>                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"> <li>Impacts are minor and mostly temporary, within the construction period</li> </ul>                                                                                                                                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"> <li>No long term social impacts associated with the cooling trench</li> <li>Cannot build new facility in available land as it is not in accordance with TRCA policy.</li> <li>Minimal disturbance to the public may occur during construction but the construction time frame will be brief</li> </ul>                                                                                                                                         |
| Economic Considerations                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Capital costs                                                               | <ul style="list-style-type: none"> <li>Moderate to high capital cost related to new pipe infrastructure, earthworks and plantings, as well as likely relocation of existing pipe infrastructure</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Proficient SUE investigation prior to design work can minimize unexpected existing pipe/utility interferences</li> </ul>                                                                                                                                                      | <ul style="list-style-type: none"> <li>Moderate to high capital cost related to new pipe infrastructure, earthworks and plantings, as well as likely relocation of existing pipe infrastructure</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Proficient SUE investigation prior to design work can minimize unexpected existing pipe/utility interferences</li> </ul>                                                                   | <ul style="list-style-type: none"> <li>Low capital cost for a relatively small excavation and materials</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Capital costs can be marginally reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required trench volume)</li> </ul>                                                                                                       |
| Maintenance and operating costs                                             | <ul style="list-style-type: none"> <li>Low to moderate maintenance costs associated with replacing filter media, unclogging perforated pipes</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Pre-treatment of stormwater with grassed filter strips can prevent some clogging of perforated pipes</li> </ul>                                                                                                                                                                                                                  | <ul style="list-style-type: none"> <li>Low to moderate maintenance costs associated with unclogging perforated pipes</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Pre-treatment of stormwater with grassed filter strips can prevent some clogging of perforated pipes</li> </ul>                                                                                                                                                       | <ul style="list-style-type: none"> <li>Low maintenance cost associated with cleaning out the trench</li> <li>Lower maintenance frequency; likely once per year, ideally not requiring access to railway lands</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Maintenance frequency should be as directed by operations manual</li> </ul>                                                                                   |
| Impact on future development and growth                                     | <ul style="list-style-type: none"> <li>Retrofit R.O.W. with bioswales may dictate R.O.W. standards for future development</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>On-site control requirements for any future intensification within the watershed would mitigate negative impacts on the LID</li> </ul>                                                                                                                                                                                                              | <ul style="list-style-type: none"> <li>Retrofit R.O.W. with perforated pipes and soakaway pits may dictate R.O.W. standards for future development</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>On-site control requirements for any future intensification within the watershed would mitigate negative impacts on the LID</li> </ul>                                                                                                  | <ul style="list-style-type: none"> <li>No impacts</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not applicable</li> </ul>                                                                                                                                                                                                                                                                                                 |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"> <li>Bioswales are a moderate to high capital cost for retrofit but may add value to a neighbourhood</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Perforated pipes and soakaway pits are a moderate to high capital cost for retrofit</li> </ul>                                                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"> <li>A cooling trench is a cost effective alternative to meet temperature criteria</li> </ul>                                                                                                                                                                                                                                                                                                                                                   |
| Results of Alternative Evaluation                                           | <ul style="list-style-type: none"> <li>This alternative is not preferred because bioswales cannot provide the required level of water quality and erosion control.</li> <li>Another alternative would need to be implemented in conjunction with bioswales in order to meet SWM objectives, making this alternative economically inefficient.</li> <li>The construction and maintenance of bioswales will create short and long term accessibility and visual impacts on residents.</li> </ul>                                                                                      | <ul style="list-style-type: none"> <li>This alternative is not preferred because infiltration in R.O.W.s cannot provide the required level of water quality and erosion control.</li> <li>Another alternative would need to be implemented in conjunction with infiltration in R.O.W.s in order to meet SWM objectives, making this alternative economically inefficient.</li> <li>The construction of infiltration pipes in R.O.W.s will create short term accessibility, visual and</li> </ul> | <ul style="list-style-type: none"> <li>Minimally invasive best management practice for temperature control. A cooling trench is cost effective and requires minimal maintenance.</li> <li>This alternative is not preferred because a new facility in the available land is not in accordance with TRCA policy.</li> </ul>                                                                                                                                                        |



| Criteria | Alternatives for Uncontrolled Outlet #8 |                                        |                |
|----------|-----------------------------------------|----------------------------------------|----------------|
|          | Bioswales                               | Infiltration in Right-of-Ways (R.O.W.) | Cooling Trench |
|          |                                         | noise impacts on residents.            |                |

| Criteria                                                                    | Alternatives for Uncontrolled Outlet #8                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  |
|-----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
|                                                                             | Aquatic and Riparian Plantings at Facility                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |  |
| Alternative Description                                                     | <ul style="list-style-type: none"><li>Plantings to increase density and area of vegetation cover surrounding facility and within facility to provide shade for cooling of detained water</li></ul>                                                                                                                                                                                                                                                                                                   |  |  |
| Location in Treatment Train                                                 | End of Pipe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |  |
| Target SWM Objective(s)                                                     | Temperature Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |  |
| Technical Considerations                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |  |
| Constructability and accessibility                                          | <ul style="list-style-type: none"><li>No constructability issues anticipated with adding plantings to proposed facilities</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Plantings enhance temperature control by providing shade</li></ul>                                                                                                                                                                                                     |  |  |
| Ability to meet stormwater management objective(s)                          | <ul style="list-style-type: none"><li>Shade from plantings will reduce the temperature of stormwater at a facility</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Plantings are better used in conjunction with other cooling methods to achieve adequate temperature control</li></ul>                                                                                                                                                         |  |  |
| Engineering best practises / innovative solution                            | <ul style="list-style-type: none"><li>Temperature control of stormwater in general is becoming an engineering best management practice in areas with sensitive habitats</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Effects of plantings can be enhanced with other methods such as use of a bottom draw outlet</li></ul>                                                                                                                    |  |  |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>Plantings at stormwater management facility are a simple alternative to provide additional temperature controls</li></ul>                                                                                                                                                                                                                                                                                                                                      |  |  |
| Natural Environment                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |  |
| Impacts to wildlife and vegetation habitats                                 | <ul style="list-style-type: none"><li>Planting native species can enhance the existing wildlife and vegetation</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul>                                                                                                                                                                                                                                                |  |  |
| Impacts / improvements based on SAR / ESA                                   | <ul style="list-style-type: none"><li>Providing additional shade at stormwater facilities reduces stormwater temperature which is a key benefit for SAR habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Effects of plantings can be enhanced with other methods such as use of a bottom draw outlet</li><li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li></ul> |  |  |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>Plantings at stormwater facilities provide positive impacts on the natural environment (provided they are non-invasive species)</li></ul>                                                                                                                                                                                                                                                                                                                      |  |  |
| Social Impacts                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |  |
| Requirement of easements or purchase of private lands                       | <ul style="list-style-type: none"><li>Not applicable (unless required in conjunction with stormwater facility construction)</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                                                                                                                                                                                                                             |  |  |
| Impacts to public and private properties due to construction and operations | <ul style="list-style-type: none"><li>No impacts to public</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                                                                                                                                                                                                                                                                                              |  |  |
| Effect on public safety                                                     | <ul style="list-style-type: none"><li>Vegetation should be suitable for proposed facility and clearly indicate any water’s edge</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Vegetation at facilities must be maintained</li></ul>                                                                                                                                                                                                            |  |  |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>No significant social impacts of plantings at stormwater facilities</li></ul>                                                                                                                                                                                                                                                                                                                                                                                  |  |  |
| Economic Considerations                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |  |

|                                         |                                                                                                                                                                                                                                                                                                |  |  |
|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| Capital costs                           | <ul style="list-style-type: none"><li>▪ Low capital cost relative to other alternatives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Costs may vary depending on extents and types of plantings</li></ul>                             |  |  |
| Maintenance and operating costs         | <ul style="list-style-type: none"><li>▪ Low maintenance costs with native, sustainable plantings</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Lower maintenance plants will minimize costs of maintenance and/or replanting</li></ul> |  |  |
| Impact on future development and growth | <ul style="list-style-type: none"><li>▪ No impact on future development</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Not applicable</li></ul>                                                                                         |  |  |
| Summary / Recommendations               | <ul style="list-style-type: none"><li>▪ Plantings at SWM facilities are a low cost alternative for providing temperature control</li></ul>                                                                                                                                                     |  |  |
| Results of Alternative Evaluation       | <ul style="list-style-type: none"><li>▪ This alternative is preferred because it will improve/maintain existing habitat and vegetation</li><li>▪ This alternative provides temperature control at a relatively low capital cost.</li></ul>                                                     |  |  |

| Table 1 –Evaluation of Conceptual Design Alternatives for Uncontrolled Outlet #55 (Uncontrolled Area) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Criteria                                                                                              | Alternatives for Uncontrolled Outlet #55                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                                                                                                       | Do Nothing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Oil-Grit Separators (OGS)                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Construct Water Quality Facility                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Alternative Description                                                                               | <ul style="list-style-type: none"><li>Stormwater runoff from the 4.77 ha major drainage area will continue to be released into the receiving watercourse uncontrolled</li></ul>                                                                                                                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"><li>One (1) unit connected to the minor system prior to final control and outfall</li></ul>                                                                                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"><li>Loss of current land use including clearing of vegetation</li><li>Significant earthworks operations</li><li>Remove and replace section of sewer and outlet infrastructure</li><li>Provision of wet habitat area adjacent to receiving watercourse</li></ul>                                                                                                                                                                                                                                                                                                                                                                      |
| Location in Treatment Train                                                                           | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | End of Pipe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Target SWM Objective(s)                                                                               | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Quality Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Technical Considerations                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Constructability and accessibility                                                                    | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"><li>Locations are accessible as OGS units could be installed upstream of the outfalls at manholes within municipal roadways; construction area is relatively small</li><li>Construction considerations include traffic interruptions and short term road closures</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Traffic management plans may reduce inconveniences associated with construction</li></ul> | <ul style="list-style-type: none"><li>Access to site is limited but achievable through existing trails</li><li>Redirection of servicing will be required to outlet to constructed dry pond</li><li>Land area is limited to be able to construct a quality facility with acceptable 4:1 side slopes</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Facility size could be reduced by incorporating water quality controls as LIDs within the drainage area</li></ul>                                                                                                                                               |
| Ability to meet stormwater management objective(s)                                                    | <ul style="list-style-type: none"><li>Does not provide for or meet the stormwater management objectives of the City and/or TRCA, for water quality, erosion or quantity control</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul>                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>OGS units may be able to provide all required stormwater quality objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Pre-treatment of stormwater runoff with LIDs will enhance the performance of the OGS</li></ul>                                                                                                                                                                              | <ul style="list-style-type: none"><li>A pond facility would be capable of fully meeting the requirements for quality control</li><li>Cannot build new facility in available land as it is not in accordance with TRCA policy.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>If land area was to permit, a wet pond facility for quantity and quality control could be constructed within a single footprint, tackling more of the stormwater objectives for the site</li><li>Quality control can be enhanced with LIDs that infiltrate runoff within the drainage area</li></ul>                                 |
| Engineering best practises / innovative solution                                                      | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"><li>OGS and similar units are noted as best management practices</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Pre-treatment of stormwater runoff with LIDs will enhance the performance of the OGS</li><li>Filtration cartridge options may be used rather than traditional OGS to target more specific pollutants</li></ul>                                                                             | <ul style="list-style-type: none"><li>Typically more traditional SWM approach</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Quality control can be enhanced with LIDs that infiltrate runoff within the drainage area</li></ul>                                                                                                                                                                                                                                                                                                                                                                                  |
| Summary / Recommendations                                                                             | <ul style="list-style-type: none"><li>Does not provide for or meet the stormwater management objectives of the City and/or TRCA, for water quality, erosion or quantity control</li></ul>                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>OGS can be effective, low-space option to provide water quality control</li></ul>                                                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>Constructability is low due to the land area constraints</li><li>Cannot build new facility in available land as it is not in accordance with TRCA policy.</li><li>If land area can be provided, a quality facility can fully meet the quality control stormwater objectives</li></ul>                                                                                                                                                                                                                                                                                                                                            |
| Natural Environment                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Impacts to wildlife and vegetation habitats                                                           | <ul style="list-style-type: none"><li>The current condition of wildlife and vegetation habitats will not change; however if the release of uncontrolled stormwater into the receiving watercourse causes future erosion in the watercourse or impacts the quality of the water in the watercourse, this could have a negative impact on the future condition of wildlife and vegetation habitats</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul> | <ul style="list-style-type: none"><li>OGS does not physically interfere with the existing outlet or impact the surrounding forested area and improves water quality prior to discharge to the watercourse</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation required</li></ul>                                                                                                                                                    | <ul style="list-style-type: none"><li>Existing vegetation will be cleared including an area of trees which is a young native forest</li><li>Results in a minor loss of terrestrial habitat</li><li>There are opportunities to improve the habitat quality of the receiving watercourse by reducing the sediment loading to the receiving watercourse</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Restoration plans will be developed to restore the surrounding areas impacted by construction</li></ul>                                                                                                       |
| Impacts / improvements based on SAR / ESA                                                             | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"><li>Meeting water quality criteria will improve water quality of downstream receiving waters</li><li>Little to no effect on temperature mitigation</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Use of OGS can be enhanced with pre-treatment using LIDs throughout minor system watershed</li></ul>                                                                                                     | <ul style="list-style-type: none"><li>There are opportunities to improve the habitat quality of the receiving watercourse by reducing the sediment loading of the watercourse</li><li>The receiving watercourse has been identified as unlikely to be Redside Dace habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li><li>Stringent construction practices can be implemented to reduce the possibility of introducing invasive species to the ecosystem during construction</li></ul> |

| Criteria                                                                    | Alternatives for Uncontrolled Outlet #55                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                             | Do Nothing                                                                                                                                                                                                                        | Oil-Grit Separators (OGS)                                                                                                                                                                                                                                                                                                                                                                                                                       | Construct Water Quality Facility                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>Existing vegetation and forest adjacent to uncontrolled outlet provides terrestrial habitat</li></ul>                                                                                       | <ul style="list-style-type: none"><li>OGS offers improvements to water quality</li><li>Used in conjunction with LIDs, OGS can improve water conditions for SAR</li></ul>                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"><li>A quality facility can be beneficial to downstream receiving waters but will alter any existing habitat within the construction area</li></ul>                                                                                                                                                                                                                                                                                                                                                                  |
| Social Impacts                                                              |                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Requirement of easements or purchase of private lands                       | N/A                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>Not required; preference to install and maintain OGS within municipal R.O.W., where maintenance is easily accessible</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                                                                                                                                         | <ul style="list-style-type: none"><li>Likely not required for the construction and maintenance of a SWM facility for UC #55, however existing land area is likely not sufficient for an at-grade SWM facility</li><li>Pond site would likely be on existing public park land and would be unavailable for public use</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Land requirements would be confirmed through conceptual design</li></ul>                                                     |
| Impacts to public and private properties due to construction and operations | N/A                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>Roadway interference and/or short-term closure would be expected for the installation of OGS units</li><li>Temporary interference to be expected on roadways during maintenance (approximately once a year)</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Traffic management plans may reduce inconveniences associated with construction</li></ul> | <ul style="list-style-type: none"><li>Noise and visual impacts associated with construction for the residences backing onto proposed SWM facility block</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Construction management plan, including restrictions on hours</li></ul>                                                                                                                                                                                                                   |
| Effect on public safety                                                     | N/A                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>Installed OGS does not pose threats to public safety</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul>                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>By building to the required side slope and depth criteria, the quality facility should not pose a threat to public safety</li><li>Since the site contains public trails, temporary hazards may be present during the construction period</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Flattened slopes, warning signs, and fencing (if required) can provide measures of safety</li><li>Trails would temporarily be closed during construction</li></ul> |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>The ‘Do Nothing’ alternative has no social impacts</li></ul>                                                                                                                                | <ul style="list-style-type: none"><li>OGS presents few and short-term impacts associated with installation and maintenance</li></ul>                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"><li>Construction of a quality facility would be a longer-term construction project with potential noise, pedestrian traffic and visual impacts</li><li>Public park land would be lost</li></ul>                                                                                                                                                                                                                                                                                                                     |
| Economic Considerations                                                     |                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Capital costs                                                               | <ul style="list-style-type: none"><li>No action may result in greater capital expenses in the future</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul> | <ul style="list-style-type: none"><li>Relatively low capital cost for installation of one (1) unit and associated infrastructure works</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Capital cost of OGS units can be reduced if stormwater is pre-treated with LIDs (thus scaling down required OGS size)</li></ul>                                                                      | <ul style="list-style-type: none"><li>Moderate to high capital cost for earthworks, grading, infrastructure components and permits</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Capital costs can be marginally reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required quality control volumes and footprint)</li></ul>                                                                                                                           |
| Maintenance and operating costs                                             | N/A                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>Fairly low maintenance cost and frequency; approximately annually</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Maintenance frequency of OGS units should not decrease with increased pre-treatment</li></ul>                                                                                                                                       | <ul style="list-style-type: none"><li>Moderate maintenance cost and frequency; likely seasonally</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Maintenance frequency should be as directed by operations manual</li><li>Maintenance frequency can be reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required quality control volume)</li></ul>                                                                                                      |
| Impact on future development and growth                                     | N/A                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>Size of OGS is static once installed and would require upgrading if a larger drainage area is directed to it (in order to meet water quality criteria)</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Additional OGS units may be installed in the future to correspond with growth</li></ul>                                                        | <ul style="list-style-type: none"><li>No impact, but detention facility would require expansion if contributing land use was to intensify</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>On-site control requirements for any intensified development within the facility’s watershed would mitigate further expansion</li></ul>                                                                                                                                                                 |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>‘Do nothing’ may postpone required works and increase future costs</li></ul>                                                                                                                | <ul style="list-style-type: none"><li>Installation of OGS units is a low to medium cost solution for achievement of most of the required SWM criteria</li></ul>                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"><li>Construction of a quality facility would present moderate to high capital costs for achievement of quality control</li></ul>                                                                                                                                                                                                                                                                                                                                                                                    |
| Results of Alternative Evaluation                                           | <ul style="list-style-type: none"><li>This alternative is not preferred because the alternative does not meet the stormwater management objectives</li></ul>                                                                      | <ul style="list-style-type: none"><li>This is a preferred alternative due to the lower cost, small disturbance area and ability to provide full quality control</li><li>This alternative can be implemented with little to no loss of existing trees.</li></ul>                                                                                                                                                                                 | <ul style="list-style-type: none"><li>Cannot build new facility in available land as it is not in accordance with TRCA policy.</li><li>This is not a preferred option because of the loss of public park space and mature trees.</li></ul>                                                                                                                                                                                                                                                                                                            |



| Criteria                                           | Alternatives for Uncontrolled Outlet #55                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
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|                                                    | Underground Storage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Infiltration in Right-of-Ways (R.O.W.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Bioswales                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Alternative Description                            | <ul style="list-style-type: none"><li>Installed in municipal lands</li><li>Underground storage tanks will capture and detain stormwater and release over an extended time period</li><li>Infiltration type underground tanks will allow for infiltration during detention period</li><li>May need water quality control prior to infiltrating (if proposed)</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"><li>Install perforated secondary pipe within existing storm sewer systems to allow for infiltration through linear soakaway pits</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"><li>Construct bioswales within the road right-of-ways within the facility drainage area</li><li>Bioswales to contain native plantings and subdrains</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Location in Treatment Train                        | End of Pipe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Conveyance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Target SWM Objectives                              | Erosion Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Quality and Erosion Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Technical Considerations                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Constructability and accessibility                 | <ul style="list-style-type: none"><li>Footprint may be large but is constructible within municipally owned lands; constructability is low to moderate</li><li>Still allows for use of land at-grade</li><li>May require re-organization of existing outlets to feed into central underground tanks</li><li>Based on soil mapping, the soil in the drainage area is not ideal for infiltration</li><li>Cannot build new facility in available land as it is not in accordance with TRCA policy.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Tanks with infiltration capabilities provide additional benefits to erosion control</li><li>Constructability would likely be increased by incorporating more than one underground tank, rather than one central system</li><li>Site specific soil testing is required to confirm suitability of infiltration measures</li></ul> | <ul style="list-style-type: none"><li>Construction area is extensive and many secondary infiltration pipes would require to be installed to achieve SWM criteria</li><li>Requires coordination with existing infrastructure and utilities</li><li>Based on soil mapping, the soil in the drainage area is not ideal for infiltration</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may be more suited as supplementary water quality / erosion / temperature control measures, where constructability and retrofit are least disruptive to existing infrastructure</li><li>Soil specific soil testing is required to confirm suitability of infiltration</li></ul> | <ul style="list-style-type: none"><li>Construction area is extensive and pipe networks are more intricate, requiring coordination with existing infrastructure</li><li>Road right of ways need to be conducive to grading and space criteria for bioswales</li><li>Based on soil mapping, the soil in the drainage area is not ideal for infiltration</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Bioswales may be more suited as supplementary water quality / erosion / temperature control measures, where constructability and retrofit are least disruptive to existing infrastructure</li><li>Soil specific soil testing is required to confirm suitability of infiltration</li></ul> |
| Ability to meet stormwater management objective(s) | <ul style="list-style-type: none"><li>Underground tanks, especially with infiltration capabilities, are effective for providing quantity and erosion control</li><li>Quantity control will be provided as feasible within the given area</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Longer detention times can enhance the erosion control</li><li>Underground storage tanks to be designed to provide quantity control; quantity control will be maximized as per the site conditions and / or restrictions</li><li>Infiltration type underground tanks will allow for infiltration during detention period</li><li>May need water quality control prior to infiltrating (if proposed)</li></ul>                                                                                                                                                                         | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may are more effective when used within a treatment train to achieve the stormwater objectives</li><li>Where soils are inadequate, ability to achieve stormwater objectives is decreased</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Additional pre-treatment will enhance the function of the perforated pipes, to reduce clogging</li></ul>                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"><li>Bioswales are more effective when used within a treatment train to achieve the stormwater objectives</li><li>Where soils are inadequate, ability to achieve stormwater objectives is decreased</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Additional pre-treatment will enhance the function of bioswales, to reduce clogging of the underdrain pipes</li></ul>                                                                                                                                                                                                                                                                                      |
| Engineering best practises / innovative solution   | <ul style="list-style-type: none"><li>Underground tanks, including infiltration, are noted as best management practices</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Maintenance of underground tanks is more extensive than at-grade alternatives</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may are innovative solutions within stormwater management</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Enhanced with further use of LIDs such as vegetated filter strips</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"><li>Bioswales are innovative solutions within stormwater management conveyance systems</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Enhanced with further use of LIDs such as vegetated filter strips</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Summary / Recommendations                          | <ul style="list-style-type: none"><li>Technically feasible for providing some or all quantity and erosion control</li><li>Infiltration might be feasible at the site, pending specific soil investigation</li><li>Requires more intrusive maintenance than at-grade facilities</li><li>Cannot build new facility in available land as it is not in accordance with TRCA policy.</li><li>Useful for maintaining land uses at-grade and visually not intrusive</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may are effective as part of a treatment train and where retrofit does not greatly interfere with existing infrastructure</li><li>Due to the poor infiltration in the soil, Infiltration in the R.O.W. is not a preferred option at Uncontrolled Outlet #55</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"><li>Bioswales are effective as part of a treatment train and where retrofit does not greatly interfere with existing infrastructure</li><li>Bioswales should not be used on their own for achievement of stormwater objectives where soil conditions are not suitable for infiltration</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Natural Environment                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Impacts to wildlife and vegetation habitats        | <ul style="list-style-type: none"><li>May require removal of some vegetation depending on specific location</li><li>Once installed, less intrusive than other alternatives because of location below grade</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Restoration plan required if loss of vegetation expected due to construction</li><li>Construction site will be designed to minimize vegetation and habitat loss, and avoid the clearing of adult trees</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"><li>May require removal of some vegetation depending on specific location; likely few impacts to existing wildlife and vegetation habitats</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Areas disturbed during construction will be restored</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>May require removal of some vegetation depending on specific location</li><li>May present phosphorus issues if not properly designed and/or maintained</li><li>Bioswales may decrease water temperature, providing benefits to the aquatic habitat of the receiving watercourse</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Planted bioswales will enhance neighbourhood with additional vegetated areas</li></ul>                                                                                                                                                                                                                                    |
| Impacts / improvements based on SAR /              | <ul style="list-style-type: none"><li>Underground tanks may improve the habitat quality of the receiving watercourse by reducing the erosion and thereby sediment</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"><li>Underground tanks may decrease water temperature, providing benefits to the aquatic habitat of the receiving watercourse</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"><li>Bioswales may decrease water temperature, providing benefits to the aquatic habitat of the receiving watercourse</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

| Criteria                                                                    | Alternatives for Uncontrolled Outlet #55                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                             | Underground Storage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Infiltration in Right-of-Ways (R.O.W.)                                                                                                                                                                                                                                                                                                                                                                                         | Bioswales                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| ESA                                                                         | loading of the receiving watercourse <ul style="list-style-type: none"> <li>The receiving watercourse has been identified as unlikely to be Redside Dace habitat</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li> <li>Stringent construction practices can be implemented to reduce the possibility of introducing invasive species to the ecosystem during construction</li> </ul> | <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Perforated pipes (exfiltration pipes) and soakaway pits may be more suited as supplementary water temperature control measures</li> </ul>                                                                                                                                                                                           | <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Bioswales may be more suited as supplementary water temperature control measures</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                              |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"> <li>Underground tanks are a long-term non-invasive alternative for providing quantity, quality and erosion control</li> <li>Adult trees may be retained</li> </ul>                                                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"> <li>Perforated pipes (exfiltration pipes) and soakaway pits present few impact on the natural environment</li> </ul>                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>Bioswales which are properly designed to avoid phosphorus loading provide positive impact on the natural environment</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                              |
| Social Impacts                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Requirement of easements or purchase of private lands                       | <ul style="list-style-type: none"> <li>Likely not required for the construction and maintenance of an underground storage tank facility for UC #55</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Land requirements would be confirmed through conceptual design</li> </ul>                                                                                                                                                                                                                               | <ul style="list-style-type: none"> <li>To be constructed within municipal R.O.W.</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not applicable</li> </ul>                                                                                                                                                                                                               | <ul style="list-style-type: none"> <li>To be constructed within municipal R.O.W.</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not applicable</li> </ul>                                                                                                                                                                                                                                                                                                                                                                    |
| Impacts to public and private properties due to construction and operations | <ul style="list-style-type: none"> <li>Noise and visual impacts associated with construction for the residences backing onto proposed SWM facility area</li> <li>Temporary closure of recreational trails during construction period</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Construction management plan, including restrictions on hours</li> </ul>                                                                                                                                              | <ul style="list-style-type: none"> <li>Impacts may include temporary, minor traffic and noise issues due to construction within the residential streets</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Appropriate construction and traffic management schedule to be adhered to</li> </ul>                                                                             | <ul style="list-style-type: none"> <li>Impacts may include temporary, minor traffic and noise issues and significant visual nuisances due to construction within the residential streets</li> <li>Bioswales are likely to face public opposition due to the maintenance requirements, visual disruption to an otherwise “clean” front lawn and inconvenience of culverts under driveways</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Appropriate construction and traffic management schedule to be adhered to</li> </ul> |
| Effect on public safety                                                     | <ul style="list-style-type: none"> <li>Temporary closure of recreational trails during construction period</li> <li>No public safety concerns beyond construction period</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Proper signage and safety measures to be set up for construction period</li> </ul>                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>No public safety concerns beyond construction period</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Proper signage and safety measures to be set up for construction period</li> </ul>                                                                                                                                           | <ul style="list-style-type: none"> <li>No public safety concerns beyond construction period</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Proper signage and safety measures to be set up for construction period</li> </ul>                                                                                                                                                                                                                                                                                                |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"> <li>Underground tanks are proposed to be located within municipal lands; not intrusive to the public after construction period</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"> <li>Impacts are minor and mostly temporary, within the construction period</li> </ul>                                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"> <li>Impacts during construction are temporary and mostly minor</li> <li>Long term impacts on residents due to visual impacts and culvert maintenance are significant</li> </ul>                                                                                                                                                                                                                                                                                                                                                                  |
| Economic Considerations                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Capital costs                                                               | <ul style="list-style-type: none"> <li>Moderate to high capital cost related to storage tank infrastructure, depending on amount of quantity control which may be incorporated and the number of tanks</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Efficient tank design to minimize capital costs</li> <li>Costs can be mitigated if tanks are only sized for erosion control, rather than including quantity control as well</li> </ul>                                                              | <ul style="list-style-type: none"> <li>Moderate to high capital cost related to new pipe infrastructure, earthworks and plantings, as well as likely relocation of existing pipe infrastructure</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Proficient SUE investigation prior to design work can minimize unexpected existing pipe/utility interferences</li> </ul> | <ul style="list-style-type: none"> <li>Moderate to high capital cost related to new pipe infrastructure, earthworks and plantings, as well as likely relocation of existing pipe infrastructure</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Proficient SUE investigation prior to design work can minimize unexpected existing pipe/utility interferences</li> </ul>                                                                                                                                                      |
| Maintenance and operating costs                                             | <ul style="list-style-type: none"> <li>Low maintenance costs associated with cleaning out tanks as per operations manual or in event of clogging</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Can prevent clogging with additional pre-treatment techniques</li> </ul>                                                                                                                                                                                                                                  | <ul style="list-style-type: none"> <li>Low to moderate maintenance costs associated with unclogging perforated pipes</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Pre-treatment of stormwater with grassed filter strips can prevent some clogging of perforated pipes</li> </ul>                                                                                     | <ul style="list-style-type: none"> <li>Low to moderate maintenance costs associated with replacing filter media, unclogging perforated pipes</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Pre-treatment of stormwater with grassed filter strips can prevent some clogging of perforated pipes</li> </ul>                                                                                                                                                                                                                  |
| Impact on future development and growth                                     | <ul style="list-style-type: none"> <li>No impact, but underground tanks would require expansion if contributing land use was to intensify</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>On-site control requirements for any future intensification within the watershed would mitigate further expansion</li> </ul>                                                                                                                                                                                     | <ul style="list-style-type: none"> <li>Retrofit R.O.W. with perforated pipes and soakaway pits may dictate R.O.W. standards for future development</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>On-site control requirements for any future intensification within the watershed would mitigate negative impacts on the LID</li> </ul>                                | <ul style="list-style-type: none"> <li>Retrofit R.O.W. with bioswales may dictate R.O.W. standards for future development</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>On-site control requirements for any future intensification within the watershed would mitigate negative impacts on the LID</li> </ul>                                                                                                                                                                                                              |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"> <li>Underground tanks provide moderate to high capital and maintenance costs for the achievement of quantity, quality and erosion control</li> <li>A larger footprint may be required with the use of this alternative</li> </ul>                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>Perforated pipes and soakaway pits are a moderate to high capital cost for retrofit</li> </ul>                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"> <li>Bioswales are a moderate to high capital cost for retrofit but may add value to a neighbourhood</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                   |

| Criteria                          | Alternatives for Uncontrolled Outlet #55                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                   | Underground Storage                                                                                                                                                                                                                                                                                        | Infiltration in Right-of-Ways (R.O.W.)                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Bioswales                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Results of Alternative Evaluation | <ul style="list-style-type: none"><li>Public recreational area would be temporarily unavailable during construction and restoration time.</li><li>This is not a preferred alternative because a new facility can not be built in the available land as it is not in accordance with TRCA policy.</li></ul> | <ul style="list-style-type: none"><li>This alternative is not preferred because bioswales cannot provide the required level of water quality and erosion control.</li><li>Another alternative would need to be implemented in conjunction with bioswales in order to meet SWM objectives, making this alternative economically inefficient.</li><li>The construction and maintenance of bioswales will create short and long term accessibility and visual impacts on residents.</li></ul> | <ul style="list-style-type: none"><li>This alternative is not preferred because infiltration in R.O.W.s cannot provide the required level of water quality and erosion control.</li><li>Another alternative would need to be implemented in conjunction with infiltration in R.O.W.s in order to meet SWM objectives, making this alternative economically inefficient.</li><li>The construction of infiltration pipes in R.O.W.s will create short term accessibility, visual and noise impacts on residents.</li></ul> |

| Criteria                                           | Alternatives for Uncontrolled Outlet #55                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |  |
|----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
|                                                    | Construct Extended Detention Facility                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |  |
| Alternative Description                            | <ul style="list-style-type: none"> <li>Significant earthworks</li> <li>Remove and replace section of existing sewer and outlet infrastructure</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |  |
| Location in Treatment Train                        | End of Pipe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |  |
| Target SWM Objectives                              | Erosion Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |  |
| Technical Considerations                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |  |
| Constructability and accessibility                 | <ul style="list-style-type: none"> <li>Access to site is limited but achievable through existing trails</li> <li>Redirection of servicing will be required to outlet to constructed dry pond</li> <li>Land area is limited to be able to construct a quality facility with acceptable 4:1 side slopes</li> <li>Pond site would likely be on existing public park land and would be unavailable for public use</li> <li>Cannot build new facility in available land as it is not in accordance with TRCA policy.</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Facility size could be reduced by incorporating water quality controls as LIDs within the drainage area</li> </ul>                                                                                                                                             |  |  |
| Ability to meet stormwater management objective(s) | <ul style="list-style-type: none"> <li>An extended detention facility would be capable of fully meeting the requirements for erosion control detention</li> <li>Cannot build new facility in available land as it is not in accordance with TRCA policy.</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>An extended detention facility for erosion control could be sized to provide quality and erosion control within a single pond block reducing construction footprints and disturbance to nearby landowners</li> <li>Erosion control can be enhanced with LIDs that detain and/or infiltrate runoff within the drainage area</li> <li>Extended detention facilities could be enhanced with outlets which consider thermal mitigation techniques, to improve water quality of the diverted flows</li> </ul>              |  |  |
| Engineering best practises / innovative solution   | <ul style="list-style-type: none"> <li>Typically more traditional SWM approach</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Erosion control can be enhanced with LIDs that detain and/or infiltrate runoff within the drainage area</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  |
| Summary / Recommendations                          | <ul style="list-style-type: none"> <li>Constructability is low due to the land area constraints</li> <li>Cannot build new facility in available land as it is not in accordance with TRCA policy.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |  |
| Natural Environment                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |  |
| Impacts to wildlife and vegetation habitats        | <ul style="list-style-type: none"> <li>Existing vegetation in the work area will be cleared</li> <li>Results in a loss of terrestrial habitat</li> <li>There are opportunities to improve the habitat quality of the receiving watercourse by reducing the peak flows entering the watercourse and thereby reducing erosion</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Restoration plans will be developed to restore the surrounding areas impacted by construction</li> <li>Vegetation can be planted on the berms of the extended detention facility which will also aid in reducing the temperature impacts of the surface detention of runoff</li> <li>Stringent construction practices can be implemented to reduce the possibility of introducing invasive species to the ecosystem during construction</li> </ul> |  |  |
| Impacts / improvements based on SAR / ESA          | <ul style="list-style-type: none"> <li>There are opportunities to improve the habitat quality of the receiving watercourse by reducing the erosion and thereby sediment loading of the receiving watercourse</li> <li>The receiving watercourse has been identified as unlikely to be Redside Dace</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |



| Criteria                                                                    | Alternatives for Uncontrolled Outlet #55                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |  |
|-----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
|                                                                             | Construct Extended Detention Facility                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |  |
|                                                                             | habitat<br><b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li><li>▪ Stringent construction practices can be implemented to reduce the possibility of introducing invasive species to the ecosystem during construction</li></ul>                                                                                                                                                              |  |  |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>▪ An extended detention facility can be beneficial to downstream receiving waters but will alter any existing habitat within the construction area</li><li>▪ Adult trees will be cleared for construction</li></ul>                                                                                                                                                                                                                                                                                                     |  |  |
| Social Impacts                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |  |
| Requirement of easements or purchase of private lands                       | <ul style="list-style-type: none"><li>▪ Likely not required for the construction and maintenance of an extended detention facility for UC #55</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Land requirements would be confirmed through conceptual design</li></ul>                                                                                                                                                                                                                                  |  |  |
| Impacts to public and private properties due to construction and operations | <ul style="list-style-type: none"><li>▪ Noise and visual impacts associated with construction for the residences backing onto proposed SWM facility block</li><li>▪ Extended Detention facility would be on existing public park land, resulting in a loss of park space</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Construction management plan, including restrictions on hours</li></ul>                                                                                                        |  |  |
| Effect on public safety                                                     | <ul style="list-style-type: none"><li>▪ By building to the required side slope and depth criteria, the dry pond facility should not pose a threat to public safety</li><li>▪ Since the site contains public trails, temporary hazards may be present during the construction period</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Adequate slopes, warning signs, and fencing (if required) can provide measures of safety</li><li>▪ Trails would temporarily be closed during construction</li></ul> |  |  |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>▪ Construction of an extended detention facility would be a longer-term construction project with potential noise, traffic and visual impacts</li></ul>                                                                                                                                                                                                                                                                                                                                                                 |  |  |
| Economic Considerations                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |  |
| Capital costs                                                               | <ul style="list-style-type: none"><li>▪ Moderate capital cost for earthworks, grading, infrastructure components, permits</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Capital costs can be marginally reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required detention volumes)</li></ul>                                                                                                                                                              |  |  |
| Maintenance and operating costs                                             | <ul style="list-style-type: none"><li>▪ Lower maintenance cost and frequency; likely every few years</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Maintenance frequency should be as directed by operations manual</li><li>▪ Maintenance frequency can be reduced by providing pre-treatment for sediment removal</li></ul>                                                                                                                                                                          |  |  |
| Impact on future development and growth                                     | <ul style="list-style-type: none"><li>▪ No impact, but extended detention facility would require expansion if contributing land use was to intensify</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ On-site control requirements for any intensified development within the facility's watershed would mitigate further expansion</li></ul>                                                                                                                                                            |  |  |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>▪ Construction of an extended detention facility would present moderate capital costs for achievement of quantity control</li></ul>                                                                                                                                                                                                                                                                                                                                                                                     |  |  |
| Results of Alternative Evaluation                                           | <ul style="list-style-type: none"><li>▪ This is not a preferred option because of the loss of public park space, removing adult trees, and can not build facility in available land as it is not in accordance with TRCA policy.</li></ul>                                                                                                                                                                                                                                                                                                                    |  |  |



| Table 1 –Evaluation of Conceptual Design Alternatives for Uncontrolled Outlet #63W (Uncontrolled Area) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Criteria                                                                                               | Alternatives for Uncontrolled Outlet #63W                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                                                                                                        | Do Nothing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Oil-Grit Separators (OGS)                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Construct Water Quality Facility                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Alternative Description                                                                                | <ul style="list-style-type: none"><li>Stormwater runoff from the 48.17 ha minor drainage area will continue to be released into the receiving watercourse uncontrolled</li></ul>                                                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"><li>One (1) unit connected to the minor system prior to final control and outfall</li></ul>                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>Loss of current land use including clearing of vegetation</li><li>Significant earthworks operations</li><li>Remove and replace section of sewer and outlet infrastructure</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Location in Treatment Train                                                                            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | End of Pipe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Target SWM Objective(s)                                                                                | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Quality Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Technical Considerations                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Constructability and accessibility                                                                     | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"><li>Location is accessible as OGS unit could be installed upstream of the outfall at a manhole within municipal roadways; construction area is relatively small</li><li>Construction considerations include traffic interruptions and short term road closures</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Traffic management plans may reduce inconveniences associated with construction</li></ul> | <ul style="list-style-type: none"><li>Site is moderately accessible</li><li>Separation of the adjacent recreational park from the construction area and the water quality facility is required for the public’s safety.</li><li>Existing changes in elevation adjacent to the river could be incorporated as a pond berm</li><li>There is not a significant elevation difference between residential areas and pond location. Pond should be cut down and include a clay liner.</li><li>There is limited space available to create staging area near the construction area. If necessary, the recreational park across the river may be required to be used for this purpose.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Acquiring easements or property acquisition of adjacent private property may be required to create the required gradient for the construction of the facility to reduce the amount of earthworks and conveyance structures</li></ul> |
| Ability to meet stormwater management objective(s)                                                     | <ul style="list-style-type: none"><li>Does not provide for or meet the stormwater management objectives of the City and/or TRCA, for water quality, erosion or quantity control</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul>                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>OGS units may be able to provide all required stormwater quality objectives</li><li>Size and number of units depends on final design area (need to confirm if industrial lots already contain on-site controls)</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Pre-treatment of stormwater runoff with LIDs will enhance the performance of the OGS</li></ul>                                       | <ul style="list-style-type: none"><li>A quality facility would be capable of fully meeting the requirements for quality control</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>A quality facility could be constructed to include extended detention volume for erosion control, if space permits</li><li>Quality control can be enhanced with LIDs that infiltrate runoff within the drainage area</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Engineering best practises / innovative solution                                                       | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"><li>OGS and similar units are noted as best management practices</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Pre-treatment of stormwater runoff with LIDs will enhance the performance of the OGS</li><li>Filtration cartridge options may be used rather than traditional OGS to target more specific pollutants</li></ul>                                                                          | <ul style="list-style-type: none"><li>Typically more traditional SWM approach</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Quality control can be enhanced with LIDs that infiltrate runoff within the drainage area</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Summary / Recommendations                                                                              | <ul style="list-style-type: none"><li>Does not provide for or meet the stormwater management objectives of the City and/or TRCA, for water quality, erosion or quantity control</li></ul>                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>OGS can be effective, low-space option to provide water quality control</li></ul>                                                                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"><li>Technically feasible, but may be constrained by land area and / or existing topography</li><li>Construction of a quality facility can fully meet the quality control SWM objectives</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Natural Environment                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Impacts to wildlife and vegetation habitats                                                            | <ul style="list-style-type: none"><li>The current condition of wildlife and vegetation habitats will not change; however if the release of uncontrolled stormwater into the receiving watercourse causes future erosion in the watercourse or impacts the quality of the water in the watercourse, this could have a negative impact on the future condition of wildlife and vegetation habitats</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul> | <ul style="list-style-type: none"><li>OGS does not physically interfere with the existing outlet or impact the surrounding forested area and improves water quality prior to discharge to the watercourse</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation required</li></ul>                                                                                                                                                 | <ul style="list-style-type: none"><li>Existing vegetation will be cleared including a area of adult trees which separates the river from the open park land</li><li>Results in a loss of terrestrial habitat</li><li>There are opportunities to improve the habitat quality of the receiving watercourse by reducing the sediment loading and potential contaminate exposure of the receiving watercourse</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Restoration plans will be developed to restore the surrounding areas impacted by construction</li><li>Riparian and aquatic vegetation can be planted on the berms and within the pond facility which will also aid in reducing the temperature impacts of the surface detention of runoff</li></ul>                                                                                                                                                                                                      |
| Impacts / improvements based on SAR / ESA                                                              | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"><li>Meeting water quality criteria will improve water quality of downstream receiving waters</li><li>Little to no effect on temperature mitigation</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b>                                                                                                                                                                                                                                             | <ul style="list-style-type: none"><li>There are opportunities to improve the habitat quality of the receiving watercourse by reducing the sediment loading of the watercourse</li><li>The receiving watercourse has been identified as unlikely to be Redside Dace</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

| Criteria                                                                           | Alternatives for Uncontrolled Outlet #63W                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                    | Do Nothing                                                                                                                                                                                                                            | Oil-Grit Separators (OGS)                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Construct Water Quality Facility                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                    |                                                                                                                                                                                                                                       | <ul style="list-style-type: none"> <li>Use of OGS can be enhanced with pre-treatment using LIDs throughout minor system watershed</li> </ul>                                                                                                                                                                                                                                                                                                                                  | habitat<br><b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li> <li>Stringent construction practices can be implemented to reduce the possibility of introducing invasive species to the ecosystem during construction</li> </ul>                                                                                                                                                                                                                                                                |
| <b>Summary / Recommendations</b>                                                   | <ul style="list-style-type: none"> <li>Existing vegetation and forest adjacent to the watercourse and around the exterior of the uncontrolled outlet provides terrestrial habitat</li> </ul>                                          | <ul style="list-style-type: none"> <li>OGS offers improvements to water quality</li> <li>Used in conjunction with LIDs, OGS can improve water conditions for SAR</li> </ul>                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>A quality pond can be beneficial to downstream receiving waters but will alter any existing habitat within the construction area</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Social Impacts                                                                     |                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Requirement of easements or purchase of private lands</b>                       | N/A                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Not required; preference to install and maintain OGS within municipal R.O.W., where maintenance is easily accessible</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not applicable</li> </ul>                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Potentially required for the construction and maintenance of a SWM facility for UC #63W</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Land requirements would be confirmed through conceptual design</li> </ul>                                                                                                                                                                                                                                                                                                                                                 |
| <b>Impacts to public and private properties due to construction and operations</b> | N/A                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Roadway interference and/or short-term closure would be expected for the installation of OGS units</li> <li>Temporary interference to be expected on roadways during maintenance (approximately once a year)</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Traffic management plans may reduce inconveniences associated with construction</li> </ul>                          | <ul style="list-style-type: none"> <li>Noise and visual impacts associated with construction for the residences and public within the recreational park backing onto proposed SWM facility block</li> <li>Pond site would likely be on existing public park land and would be unavailable for public use</li> <li>A construction staging area may need to be set up in the adjoining recreational park, which would prevent the public from using the park during construction.</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Construction management plan, including restrictions on hours</li> </ul> |
| <b>Effect on public safety</b>                                                     | N/A                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Installed OGS does not pose threats to public safety</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>No mitigation undertaken</li> </ul>                                                                                                                                                                                                                                         | <ul style="list-style-type: none"> <li>By building to the required side slope and depth criteria, the quality pond facility should not pose a threat to public safety</li> <li>There are no trails though this green space however it is adjoining to a recreational park, these areas would have to be separated by fencing after the facility is completed.</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Flattened slopes, warning signs, and fencing (if required) can provide measures of safety</li> </ul>                                                                                       |
| <b>Summary / Recommendations</b>                                                   | <ul style="list-style-type: none"> <li>The ‘Do Nothing’ alternative has no social impacts</li> </ul>                                                                                                                                  | <ul style="list-style-type: none"> <li>OGS presents few and short-term impacts associated with installation and maintenance</li> </ul>                                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>Construction of a wet pond facility would be a longer-term construction project with potential noise, traffic and visual impacts</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Economic Considerations                                                            |                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Capital costs</b>                                                               | <ul style="list-style-type: none"> <li>No action may result in greater capital expenses in the future</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not applicable</li> </ul> | <ul style="list-style-type: none"> <li>Relatively low capital cost for installation of one (1) unit and associated infrastructure works; cost will increase if additional units are required to meet the stormwater quality objectives</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Capital cost of OGS units can be reduced if stormwater is pre-treated with LIDs (thus scaling down required OGS size)</li> </ul> | <ul style="list-style-type: none"> <li>Moderate to high capital cost for earthworks, grading, infrastructure components and permits</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Capital costs can be marginally reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required quality control volumes and footprint)</li> </ul>                                                                                                                                                                                                                                |
| <b>Maintenance and operating costs</b>                                             | N/A                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Fairly low maintenance cost and frequency; approximately annually</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Maintenance frequency of OGS units should not decrease with increased pre-treatment</li> </ul>                                                                                                                                                                 | <ul style="list-style-type: none"> <li>Moderate maintenance cost and frequency; likely seasonally</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Maintenance frequency should be as directed by operations manual</li> <li>Maintenance frequency can be reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required quality control volume)</li> </ul>                                                                                                                                                                                                          |
| <b>Impact on future development and growth</b>                                     | N/A                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Size of OGS is static once installed and would require upgrading if a larger drainage area is directed to it (in order to meet water quality criteria)</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Additional OGS units may be installed in the future to correspond with growth</li> </ul>                                                                                  | <ul style="list-style-type: none"> <li>No impact, but detention facility would require expansion if contributing land use was to intensify</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>On-site control requirements for any intensified development within the facility’s watershed would mitigate further expansion</li> </ul>                                                                                                                                                                                                                                                                      |
| <b>Summary / Recommendations</b>                                                   | <ul style="list-style-type: none"> <li>‘Do nothing’ may postpone required works and increase future costs</li> </ul>                                                                                                                  | <ul style="list-style-type: none"> <li>Installation of OGS units is a low to medium cost solution for achievement of most of the required SWM criteria</li> </ul>                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>Construction of a quality pond facility would present moderate to high capital costs for achievement of quality control</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |



| Criteria                          | Alternatives for Uncontrolled Outlet #63W                                                                                                                    |                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                             |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                   | Do Nothing                                                                                                                                                   | Oil-Grit Separators (OGS)                                                                                                                                                                                                                                       | Construct Water Quality Facility                                                                                                                                                                                            |
| Results of Alternative Evaluation | <ul style="list-style-type: none"><li>This alternative is not preferred because the alternative does not meet the stormwater management objectives</li></ul> | <ul style="list-style-type: none"><li>This is a preferred alternative due to the lower cost, small disturbance area and ability to provide full quality control</li><li>This alternative can be implemented with little to no loss of existing trees.</li></ul> | <ul style="list-style-type: none"><li>A wet pond facility would be capable of fully meeting the requirements for quality control</li><li>This is not a preferred option because of the loss of public park space.</li></ul> |

| Criteria                                           | Alternatives for Uncontrolled Outlet #63W                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                    |
|----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
|                                                    | Construct Extended Detention Facility                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Underground Storage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                    |
| Alternative Description                            | <ul style="list-style-type: none"><li>▪ Loss of current land use including clearing of vegetation</li><li>▪ Significant earthworks</li><li>▪ Remove and replace section of existing sewer and outlet infrastructure</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>▪ Installed at proposed pond block location</li><li>▪ Underground storage tanks will capture and detain stormwater and release over an extended time period</li><li>▪ Infiltration type underground tanks will allow for infiltration during detention period</li><li>▪ May need water quality control prior to infiltrating (if proposed)</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"><li>▪ </li></ul> |
| Location in Treatment Train                        | End of Pipe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                    |
| Target SWM Objectives                              | Erosion Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Erosion Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                    |
| Technical Considerations                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                    |
| Constructability and accessibility                 | <ul style="list-style-type: none"><li>▪ Site is moderately accessible</li><li>▪ Separation of the adjacent recreational park from the construction area and the water quality facility is required for the public’s safety.</li><li>▪ Existing changes in elevation adjacent to the river could be incorporated as a pond berm</li><li>▪ There is not a significant elevation difference between residential areas and pond location. Pond should be cut down and include a clay liner.</li><li>▪ There is limited space available to create staging area near the construction area. If necessary, the recreational park across the river may be required to be used for this purpose.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Acquiring easements or property acquisition of adjacent private property may be required to create the required gradient for the construction of the facility to reduce the amount of earthworks and conveyance structures</li></ul> | <ul style="list-style-type: none"><li>▪ Footprint may be large but is constructible within municipally owned pond block lands; constructability is moderate to complex based on existing site topography</li><li>▪ Depth of construction may be limited by tank specifications; available volume may be reduced</li><li>▪ Still allows for use of land at-grade</li><li>▪ May require re-organization of existing outlets to feed into central underground tanks</li><li>▪ Based on soil mapping, the western section of the drainage area is not ideal for infiltration. Soil in the eastern section of the drainage area and the pond block is conducive to infiltration.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Tanks with infiltration capabilities provide additional benefits to erosion control</li><li>▪ Soil specific soil testing is required to confirm suitability of infiltration</li></ul> | <ul style="list-style-type: none"><li>▪ </li></ul> |
| Ability to meet stormwater management objective(s) | <ul style="list-style-type: none"><li>▪ An extended detention facility would be capable of fully meeting the requirements for erosion control detention</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ An extended detention facility could be combined with quality and quantity controls, if land area permits</li><li>▪ Erosion control can be enhanced with LIDs that detain and/or infiltrate runoff within the drainage area</li><li>▪ Extended detention facilities could be enhanced with outlets which consider thermal mitigation techniques, to improve water quality of the diverted flows</li></ul>                                                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"><li>▪ Underground tanks, especially with infiltration capabilities, are effective for providing quantity, quality and erosion control</li><li>▪ Given the large size of the drainage area, and the construction limitations of tank depth, and the constructible space limitations of the site, an underground storage tank would not be able to fully meet erosion control criteria</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Infiltration type underground tanks will allow for infiltration during detention period</li><li>▪ May need water quality control prior to infiltrating (if proposed)</li></ul>                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"><li>▪ </li></ul> |
| Engineering best practises / innovative solution   | <ul style="list-style-type: none"><li>▪ Typically more traditional SWM approach</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Erosion control can be enhanced with LIDs that detain and/or infiltrate runoff within the drainage area</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"><li>▪ Underground tanks, including infiltration, are noted as best management practices</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Maintenance of underground tanks is more extensive than at-grade alternatives</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"><li>▪ </li></ul> |
| Summary / Recommendations                          | <ul style="list-style-type: none"><li>▪ Technically feasible</li><li>▪ Construction of a extended detention facility can fully meet the erosion control SWM criteria</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"><li>▪ Technically feasible, requiring more intrusive maintenance</li><li>▪ All required storage may not be provided based on depth of installation</li><li>▪ Useful for maintaining land uses at-grade and visually not intrusive</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>▪ </li></ul> |
| Natural Environment                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                    |
| Impacts to wildlife and vegetation habitats        | <ul style="list-style-type: none"><li>▪ Existing vegetation will be cleared including the adult forest adjacent to the watercourse</li><li>▪ Results in a loss of terrestrial habitat</li><li>▪ There are opportunities to improve the habitat quality of the receiving watercourse by reducing the peak flows entering the watercourse and thereby reducing erosion</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Restoration plans will be developed to restore the surrounding areas impacted by construction</li><li>▪ Vegetation can be planted on the berms of the extended detention facility which will also aid in reducing the temperature impacts of the surface detention of runoff</li></ul>                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>▪ May require removal of some vegetation depending on specific location</li><li>▪ Once installed, less intrusive than other alternatives because of location below grade</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Restoration plan required if loss of vegetation expected due to construction</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"><li>▪ </li></ul> |

| Criteria                                                                    | Alternatives for Uncontrolled Outlet #63W                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                  |
|-----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|
|                                                                             | Construct Extended Detention Facility                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Underground Storage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                  |
| Impacts / improvements based on SAR / ESA                                   | <ul style="list-style-type: none"><li>There are opportunities to improve the habitat quality of the receiving watercourse by reducing the erosion and thereby sediment loading of the receiving watercourse</li><li>The receiving watercourse has been identified as unlikely to be Redside Dace habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li><li>Stringent construction practices can be implemented to reduce the possibility of introducing invasive species to the ecosystem during construction</li></ul> | <ul style="list-style-type: none"><li>Underground tanks may improve the habitat quality of the receiving watercourse by reducing the erosion and thereby sediment loading of the receiving watercourse</li><li>The receiving watercourse has been identified as unlikely to be Redside Dace habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li><li>Stringent construction practices can be implemented to reduce the possibility of introducing invasive species to the ecosystem during construction</li></ul> | <ul style="list-style-type: none"><li></li></ul> |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>A extended detention facility can be beneficial to downstream receiving waters but will alter any existing habitat within the construction area</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>Underground tanks are a long-term non-invasive alternative for providing quantity, quality and erosion control</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li></li></ul> |
| Social Impacts                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                  |
| Requirement of easements or purchase of private lands                       | <ul style="list-style-type: none"><li>Potentially required for the construction and maintenance of a SWM facility for UC #63W</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Land requirements would be confirmed through conceptual design</li></ul>                                                                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>Potentially required for the construction and maintenance of an underground storage tank facility for UC #63W</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Land requirements would be confirmed through conceptual design</li></ul>                                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li></li></ul> |
| Impacts to public and private properties due to construction and operations | <ul style="list-style-type: none"><li>Noise and visual impacts associated with construction for the residences and public within the recreational park backing onto proposed SWM facility block</li><li>A construction staging area may need to be set up in the adjoining recreational park, which would prevent the public from using the park during construction.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Construction management plan, including restrictions on hours</li></ul>                                                                                                                                                    | <ul style="list-style-type: none"><li>Noise and visual impacts associated with construction for the residences and public within the recreational park backing onto proposed SWM facility block</li><li>A construction staging area may need to be set up in the adjoining recreational park, which would prevent the public from using the park during construction.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Construction management plan, including restrictions on hours</li></ul>                                                                                                                                               | <ul style="list-style-type: none"><li></li></ul> |
| Effect on public safety                                                     | <ul style="list-style-type: none"><li>By building to the required side slope and depth criteria, the wet pond facility should not pose a threat to public safety</li><li>There are no trails though this green space however it is adjoining to a recreational park, these areas would have to be separated by fencing after the facility is completed.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Adequate slopes, warning signs, and fencing (if required) can provide measures of safety</li></ul>                                                                                                                                       | <ul style="list-style-type: none"><li>No public safety concerns beyond construction period</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Proper signage and safety measures to be set up for construction period</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li></li></ul> |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>Construction of an extended detention facility would be a longer-term construction project with potential noise, traffic and visual impacts</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"><li>Underground tanks are proposed to be located in the proposed pond block; not intrusive to the public after construction</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"><li></li></ul> |
| Economic Considerations                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                  |
| Capital costs                                                               | <ul style="list-style-type: none"><li>Moderate to high capital cost for earthworks, grading, infrastructure components, permits</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Capital costs can be marginally reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required detention volumes)</li></ul>                                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"><li>Moderate to high capital cost related to storage tank infrastructure</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Efficient tank design to minimize capital costs</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"><li></li></ul> |
| Maintenance and operating costs                                             | <ul style="list-style-type: none"><li>Lower maintenance cost and frequency; likely every few years</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Maintenance frequency should be as directed by operations manual</li><li>Maintenance frequency can be reduced by providing pre-treatment for sediment removal</li></ul>                                                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"><li>Low maintenance costs associated with cleaning out tanks as per operations manual or in event of clogging</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Can prevent clogging with additional pre-treatment techniques</li></ul>                                                                                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"><li></li></ul> |
| Impact on future development and growth                                     | <ul style="list-style-type: none"><li>No impact, but extended detention facility would require expansion if contributing land use was to intensify</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>On-site control requirements for any intensified development within the facility's watershed would mitigate further expansion</li></ul>                                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"><li>No impact, but underground tanks would require expansion if contributing land use was to intensify</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>On-site control requirements for any future intensification within the watershed would mitigate further expansion</li></ul>                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"><li></li></ul> |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>Construction of an extended detention facility would present moderate to high</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"><li>Underground tanks provide moderate to high capital and maintenance costs for the</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li></li></ul> |

| Criteria                          | Alternatives for Uncontrolled Outlet #63W                                                                               |                                                                                                                                                                                                                                                                                                            |                                                  |
|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|
|                                   | Construct Extended Detention Facility                                                                                   | Underground Storage                                                                                                                                                                                                                                                                                        |                                                  |
|                                   | capital costs for achievement of quantity control                                                                       | achievement of quantity, quality and erosion control <ul style="list-style-type: none"><li>A larger footprint may be required with the use of this alternative</li></ul>                                                                                                                                   |                                                  |
| Results of Alternative Evaluation | <ul style="list-style-type: none"><li>This is not a preferred option because of the loss of public park space</li></ul> | <ul style="list-style-type: none"><li>This is a preferred alternative because public recreational land can be restored after construction of an underground storage tank as compared to a pond. This alternative would be constructed such that it minimizes the number of adult trees affected.</li></ul> | <ul style="list-style-type: none"><li></li></ul> |



| Criteria                                              | Alternatives for Uncontrolled Outlet #63W                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |
|-------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
|                                                       | Bioswales                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Infiltration in Right-of-Ways (R.O.W.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |
| Alternative Description                               | <ul style="list-style-type: none"><li>Construct bioswales within the road right-of-ways within the facility drainage area</li><li>Bioswales to contain native plantings and subdrains</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"><li>Install perforated secondary pipe within existing storm sewer systems to allow for infiltration through linear soakaway pits</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |
| Location in Treatment Train                           | Conveyance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Target SWM Objective(s)                               | Quality and Erosion Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Technical Considerations                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Constructability and accessibility                    | <ul style="list-style-type: none"><li>Construction area is extensive and pipe networks are more intricate, requiring coordination with existing infrastructure</li><li>Road right of ways need to be conducive to grading and space criteria for bioswales</li><li>Based on soil mapping, the western section of the drainage area is not ideal for infiltration. Soil in the eastern section of the drainage area and the proposed pond block is conducive to infiltration.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Bioswales may be more suited as supplementary water quality / erosion / temperature control measures, where constructability and retrofit are least disruptive to existing infrastructure</li><li>Site specific soil testing is required to confirm suitability of infiltration measures</li></ul> | <ul style="list-style-type: none"><li>Construction area is extensive and many secondary infiltration pipes would require to be installed to achieve SWM criteria</li><li>Requires coordination with existing infrastructure and utilities</li><li>Based on soil mapping, the western section of the drainage area is not ideal for infiltration. Soil in the eastern section of the drainage area and the proposed pond block is conducive to infiltration.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may be more suited as supplementary water quality / erosion / temperature control measures, where constructability and retrofit are least disruptive to existing infrastructure</li><li>Site specific soil testing is required to confirm suitability of infiltration measures</li></ul> |  |
| Ability to meet stormwater management objective(s)    | <ul style="list-style-type: none"><li>Bioswales are more effective when used within a treatment train to achieve the stormwater objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Additional pre-treatment will enhance the function of bioswales, to reduce clogging of the underdrain pipes</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may are more effective when used within a treatment train to achieve the stormwater objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Additional pre-treatment will enhance the function of the perforated pipes, to reduce clogging</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |
| Engineering best practises / innovative solution      | <ul style="list-style-type: none"><li>Bioswales are innovative solutions within stormwater management conveyance systems</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Enhanced with further use of LIDs such as vegetated filter strips</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may are innovative solutions within stormwater management</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Enhanced with further use of LIDs such as vegetated filter strips</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| Summary / Recommendations                             | <ul style="list-style-type: none"><li>Bioswales are effective as part of a treatment train and where retrofit does not greatly interfere with existing infrastructure</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may are effective as part of a treatment train and where retrofit does not greatly interfere with existing infrastructure</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
| Natural Environment                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Impacts to wildlife and vegetation habitats           | <ul style="list-style-type: none"><li>May require removal of some vegetation depending on specific location</li><li>May present phosphorus issues if not properly designed and/or maintained</li><li>Bioswales may decrease water temperature, providing benefits to the aquatic habitat of the receiving watercourse</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Planted bioswales will enhance neighbourhoods with additional vegetated areas</li></ul>                                                                                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"><li>May require removal of some vegetation depending on specific location; likely few impacts to existing wildlife and vegetation habitats</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Areas disturbed during construction will be restored</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Impacts / improvements based on SAR / ESA             | <ul style="list-style-type: none"><li>Bioswales may decrease water temperature, providing benefits to the aquatic habitat of the receiving watercourse</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Bioswales may be more suited as supplementary water temperature control measures</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>Underground tanks may decrease water temperature, providing benefits to the aquatic habitat of the receiving watercourse</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may be more suited as supplementary water temperature control measures</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |
| Summary / Recommendations                             | <ul style="list-style-type: none"><li>Bioswales which are properly designed to avoid phosphorus loading provide positive impact on the natural environment</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits present few impact on the natural environment</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |
| Social Impacts                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Requirement of easements or purchase of private lands | <ul style="list-style-type: none"><li>To be constructed within municipal R.O.W.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"><li>To be constructed within municipal R.O.W.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |

| Criteria                                                                    | Alternatives for Uncontrolled Outlet #63W                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
|-----------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
|                                                                             | Bioswales                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Infiltration in Right-of-Ways (R.O.W.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |
| Impacts to public and private properties due to construction and operations | <ul style="list-style-type: none"><li>▪ Impacts may include temporary, minor traffic and noise issues and significant visual nuisances due to construction within the residential streets</li><li>▪ Bioswales are likely to face public opposition due to the maintenance requirements, visual disruption to an otherwise “clean” front lawn and inconvenience of culverts under driveways</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Appropriate construction and traffic management schedule to be adhered to</li></ul> | <ul style="list-style-type: none"><li>▪ Impacts may include temporary, minor traffic and noise issues due to construction within the residential streets</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Appropriate construction and traffic management schedule to be adhered to</li></ul>                                                                                                                                                                             |  |
| Effect on public safety                                                     | <ul style="list-style-type: none"><li>▪ No public safety concerns beyond construction period</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Proper signage and safety measures to be set up for construction period</li></ul>                                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"><li>▪ No public safety concerns beyond construction period</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Proper signage and safety measures to be set up for construction period</li></ul>                                                                                                                                                                                                                                           |  |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>▪ Impacts during construction are temporary and mostly minor</li><li>▪ Long term impacts on residents due to visual impacts and culvert maintenance are significant</li></ul>                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>▪ Impacts are minor and mostly temporary, within the construction period</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                       |  |
| Economic Considerations                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
| Capital costs                                                               | <ul style="list-style-type: none"><li>▪ Moderate to high capital cost related to new pipe infrastructure, earthworks and plantings, as well as likely relocation of existing pipe infrastructure</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Proficient SUE investigation prior to design work can minimize unexpected existing pipe/utility interferences</li></ul>                                                                                                                                                       | <ul style="list-style-type: none"><li>▪ Moderate to high capital cost related to new pipe infrastructure, earthworks and plantings, as well as likely relocation of existing pipe infrastructure</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Proficient SUE investigation prior to design work can minimize unexpected existing pipe/utility interferences</li></ul>                                                                                                 |  |
| Maintenance and operating costs                                             | <ul style="list-style-type: none"><li>▪ Low to moderate maintenance costs associated with replacing filter media, unclogging perforated pipes</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Pre-treatment of stormwater with grassed filter strips can prevent some clogging of perforated pipes</li></ul>                                                                                                                                                                                                                   | <ul style="list-style-type: none"><li>▪ Low to moderate maintenance costs associated with unclogging perforated pipes</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Pre-treatment of stormwater with grassed filter strips can prevent some clogging of perforated pipes</li></ul>                                                                                                                                                                                     |  |
| Impact on future development and growth                                     | <ul style="list-style-type: none"><li>▪ Retrofit R.O.W. with bioswales may dictate R.O.W. standards for future development</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ On-site control requirements for any future intensification within the watershed would mitigate negative impacts on the LID</li></ul>                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>▪ Retrofit R.O.W. with perforated pipes and soakaway pits may dictate R.O.W. standards for future development</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ On-site control requirements for any future intensification within the watershed would mitigate negative impacts on the LID</li></ul>                                                                                                                                |  |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>▪ Bioswales are a moderate to high capital cost for retrofit but may add value to a neighbourhood</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"><li>▪ Perforated pipes and soakaway pits are a moderate to high capital cost for retrofit</li></ul>                                                                                                                                                                                                                                                                                                                                                                                          |  |
| Results of Alternative Evaluation                                           | <ul style="list-style-type: none"><li>▪ This alternative is not preferred because bioswales cannot provide the required level of water quality and erosion control.</li><li>▪ Another alternative would need to be implemented in conjunction with bioswales in order to meet SWM objectives, making this alternative economically inefficient.</li><li>▪ The construction and maintenance of bioswales will create short and long term accessibility and visual impacts on residents.</li></ul>                                                                                     | <ul style="list-style-type: none"><li>▪ This alternative is not preferred because infiltration in R.O.W.s cannot provide the required level of water quality and erosion control.</li><li>▪ Another alternative would need to be implemented in conjunction with infiltration in R.O.W.s in order to meet SWM objectives, making this alternative economically inefficient.</li><li>▪ The construction of infiltration pipes in R.O.W.s will create short term accessibility, visual and noise impacts on residents.</li></ul> |  |

| Table 1 –Evaluation of Conceptual Design Alternatives for Uncontrolled Outlet #66 (Uncontrolled Area) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Criteria                                                                                              | Alternatives for Uncontrolled Outlet #66                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                                       | Do Nothing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Oil-Grit Separators (OGS)                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Construct Water Quality Facility                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Alternative Description                                                                               | <ul style="list-style-type: none"><li>Stormwater runoff from the 13.34 ha minor drainage area will continue to be released into the receiving watercourse uncontrolled</li></ul>                                                                                                                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"><li>1 unit connected to the minor system prior to final control and outfall</li></ul>                                                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>Loss of current land use including clearing of vegetation</li><li>Significant earthworks operations</li><li>Remove and replace section of sewer and outlet infrastructure</li><li>Provision of wet habitat area adjacent to receiving watercourse</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Location in Treatment Train                                                                           | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | End of Pipe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Target SWM Objective(s)                                                                               | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Quality Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Technical Considerations                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Constructability and accessibility                                                                    | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>Locations are accessible as OGS units could be installed upstream of the outfalls at manholes within municipal roadways; construction area is relatively small</li><li>Construction considerations include traffic interruptions and short term road closures</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Traffic management plans may reduce inconveniences associated with construction</li></ul> | <ul style="list-style-type: none"><li>Access to site is limited but achievable through an access road</li><li>Redirection of servicing will be required to outlet to constructed wet pond</li><li>Existing changes in elevation could be incorporated as pond berms</li><li>Significant elevation difference between roadways and pond location. Pond can be built up to keep out of water table or cut down and include a clay liner</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Acquiring easements or property acquisition of adjacent private property may be required to utilize the existing gradient for construction of pond berms thereby reducing the amount of earthworks and conveyance structures</li></ul>                                                                                                                                                                                                                                                  |
| Ability to meet stormwater management objective(s)                                                    | <ul style="list-style-type: none"><li>Does not provide for or meet the stormwater management objectives of the City and/or TRCA, for water quality, erosion or quantity control</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul>                                                                                                                                                                                                                   | <ul style="list-style-type: none"><li>OGS units may be able to provide all required stormwater quality objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Pre-treatment of stormwater runoff with LIDs will enhance the performance of the OGS</li></ul>                                                                                                                                                                              | <ul style="list-style-type: none"><li>A wet pond facility would be capable of fully meeting the requirements for quality control</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>A wet pond facility for quantity control could be constructed to include active storage capacity that will provide quantity and erosion control within a single footprint reducing disturbance to nearby landowners</li><li>Quality control can be enhanced with LIDs that infiltrate runoff within the drainage area</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Engineering best practises / innovative solution                                                      | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>OGS and similar units are noted as best management practices</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Pre-treatment of stormwater runoff with LIDs will enhance the performance of the OGS</li><li>Filtration cartridge options may be used rather than traditional OGS to target more specific pollutants</li></ul>                                                                             | <ul style="list-style-type: none"><li>Typically more traditional SWM approach</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Quality control can be enhanced with LIDs that infiltrate runoff within the drainage area</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Summary / Recommendations                                                                             | <ul style="list-style-type: none"><li>Does not provide for or meet the stormwater management objectives of the City and/or TRCA, for water quality, erosion or quantity control</li></ul>                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>OGS can be effective, low-space option to provide water quality control</li></ul>                                                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>Technically feasible</li><li>Construction of a surface detention facility can fully meet the quality control SWM criteria</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Natural Environment                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Impacts to wildlife and vegetation habitats                                                           | <ul style="list-style-type: none"><li>The current condition of wildlife and vegetation habitats will not change; however if the release of uncontrolled stormwater into the receiving watercourse causes future erosion in the watercourse or impacts the quality of the water in the watercourse, this could have a negative impact on the future condition of wildlife and vegetation habitats.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul> | <ul style="list-style-type: none"><li>OGS does not physically interfere with the existing outlet or impact the surrounding forested area and improves water quality prior to discharge to the watercourse</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation required</li></ul>                                                                                                                                                    | <ul style="list-style-type: none"><li>Existing vegetation will be cleared including a area of trees which is a young native forest</li><li>Results in a loss of terrestrial habitat but a gain in aquatic habitat for migrating birds and terrestrial animals</li><li>There are opportunities to improve the habitat quality of the receiving watercourse by reducing the sediment loading and potential contaminate exposure of the receiving watercourse</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Restoration plans will be developed to restore the surrounding areas impacted by construction</li><li>Riparian and aquatic vegetation can be planted on the berms and within the wet pond facility which will also aid in reducing the temperature impacts of the surface detention of runoff</li><li>Stringent construction practices can be implemented to reduce the possibility of introducing invasive species to the ecosystem during construction</li></ul> |
| Impacts / improvements based on SAR /                                                                 | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>Meeting water quality criteria will improve water quality of downstream receiving waters</li><li>Little to no effect on temperature mitigation</li></ul>                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"><li>There are opportunities to improve the habitat quality of the receiving watercourse by reducing the sediment loading of the</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

| Criteria                                                                    | Alternatives for Uncontrolled Outlet #66                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
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|                                                                             | Do Nothing                                                                                                                                                                                                                        | Oil-Grit Separators (OGS)                                                                                                                                                                                                                                                                                                                                                                                                                       | Construct Water Quality Facility                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| ESA                                                                         |                                                                                                                                                                                                                                   | <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Use of OGS can be enhanced with pre-treatment using LIDs throughout minor system watershed</li></ul>                                                                                                                                                                                                                                                  | <p>watercourse</p> <ul style="list-style-type: none"><li>The receiving watercourse has been identified as unlikely to be Redside Dace habitat</li><li>Wet ponds can provide reduction of stormwater temperature with the inclusion of a bottom draw outlet and shading from vegetation</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li><li>Stringent construction practices can be implemented to reduce the possibility of introducing invasive species to the ecosystem during construction</li></ul> |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>Existing vegetation and forest adjacent to uncontrolled outlet provides terrestrial habitat and will remain in the current condition</li></ul>                                              | <ul style="list-style-type: none"><li>OGS offers improvements to water quality</li><li>Used in conjunction with LIDs, OGS can improve water conditions for SAR</li></ul>                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"><li>A wet pond can be beneficial to downstream receiving waters but will alter any existing habitat within the construction area</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Social Impacts                                                              |                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Requirement of easements or purchase of private lands                       | N/A                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>Likely not required; preference to install and maintain OGS within municipal R.O.W., where maintenance is easily accessible</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                                                                                                                                  | <ul style="list-style-type: none"><li>Likely not required for the construction and maintenance of a SWM facility for UC #67</li><li>If easements of adjacent private property was acquired than a larger facility could be constructed to provide SWM controls for UC #66 in addition to UC #67</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Land requirements would be confirmed through conceptual design</li></ul>                                                                                                                                                                                                       |
| Impacts to public and private properties due to construction and operations | N/A                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>Roadway interference and/or short-term closure would be expected for the installation of OGS units</li><li>Temporary interference to be expected on roadways during maintenance (approximately once a year)</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Traffic management plans may reduce inconveniences associated with construction</li></ul> | <ul style="list-style-type: none"><li>Noise and visual impacts associated with construction for the residences backing onto proposed SWM facility block</li><li>A construction staging area may need to be set up at the dead-end of nearby street and block access point which could disrupt local residents</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Construction management plan, including restrictions on hours</li></ul>                                                                                                                                                                                          |
| Effect on public safety                                                     | N/A                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>Installed OGS does not pose threats to public safety</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul>                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>By building to the required side slope and depth criteria, the wet pond facility should not pose a threat to public safety</li><li>There are no trails though this green space and public access is very limited, thereby reducing the exposure of public to the facility</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Flattened slopes, warning signs, and fencing (if required) can provide measures of safety</li></ul>                                                                                                                                                            |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>The ‘Do Nothing’ alternative has no social impacts</li></ul>                                                                                                                                | <ul style="list-style-type: none"><li>OGS presents few and short-term impacts associated with installation and maintenance</li></ul>                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"><li>Construction of a wet pond facility would be a longer-term construction project with potential noise, traffic and visual impacts</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Economic Considerations                                                     |                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Capital costs                                                               | <ul style="list-style-type: none"><li>No action may result in greater capital expenses in the future</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul> | <ul style="list-style-type: none"><li>Relatively low capital cost for installation of one (1) unit and associated infrastructure works</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Capital cost of OGS units can be reduced if stormwater is pre-treated with LIDs (thus scaling down required OGS size)</li></ul>                                                                      | <ul style="list-style-type: none"><li>Moderate to high capital cost for earthworks, grading, infrastructure components and permits</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Capital costs can be marginally reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required quality control volumes and footprint)</li></ul>                                                                                                                                                                                                                                                        |
| Maintenance and operating costs                                             | N/A                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>Fairly low maintenance cost and frequency; approximately annually</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Maintenance frequency of OGS units should not decrease with increased pre-treatment</li></ul>                                                                                                                                       | <ul style="list-style-type: none"><li>Moderate maintenance cost and frequency; likely seasonally</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Maintenance frequency should be as directed by operations manual</li><li>Maintenance frequency can be reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required quality control volume)</li></ul>                                                                                                                                                                                                                                   |
| Impact on future development and growth                                     | N/A                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>Size of OGS is static once installed and would require upgrading if a larger drainage area is directed to it (in order to meet water quality criteria)</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Additional OGS units may be installed in the</li></ul>                                                                                         | <ul style="list-style-type: none"><li>No impact, but detention facility would require expansion if contributing land use was to intensify</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>On-site control requirements for any intensified development within the facility’s</li></ul>                                                                                                                                                                                                                                                                                                                                         |



| Criteria                          | Alternatives for Uncontrolled Outlet #66                                                                                                                       |                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                            |
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|                                   | Do Nothing                                                                                                                                                     | Oil-Grit Separators (OGS)                                                                                                                                                                                                                                           | Construct Water Quality Facility                                                                                                                                                                                                                                                                                                           |
|                                   |                                                                                                                                                                | future to correspond with growth                                                                                                                                                                                                                                    | watershed would mitigate further expansion                                                                                                                                                                                                                                                                                                 |
| Summary / Recommendations         | <ul style="list-style-type: none"><li>▪ ‘Do nothing’ may postpone required works and increase future costs</li></ul>                                           | <ul style="list-style-type: none"><li>▪ Installation of OGS units is a low to medium cost solution for achievement of most of the required SWM criteria</li></ul>                                                                                                   | <ul style="list-style-type: none"><li>▪ Construction of a wet pond facility would present moderate to high capital costs for achievement of quality control</li></ul>                                                                                                                                                                      |
| Results of Alternative Evaluation | <ul style="list-style-type: none"><li>▪ This alternative is not preferred because the alternative does not meet the stormwater management objectives</li></ul> | <ul style="list-style-type: none"><li>▪ This is a preferred alternative due to the lower cost, small disturbance area and ability to provide full quality control</li><li>▪ This alternative can be implemented with little to no loss of existing trees.</li></ul> | <ul style="list-style-type: none"><li>▪ A wet pond facility would be capable of fully meeting the requirements for quality control</li><li>▪ Retaining existing trees is a high priority for the City of Markham; however tree loss is probable for construction of this alternative. Therefore, this is not a preferred option.</li></ul> |

| Criteria                                                                    | Alternatives for Uncontrolled Outlet #66                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                    |
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|                                                                             | Underground Storage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Bioswales                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Infiltration in Right-of-Ways (R.O.W)              |
| Alternative Description                                                     | <ul style="list-style-type: none"><li>▪ Install perforated secondary pipe within existing storm sewer systems to allow for infiltration through linear soakaway pits</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"><li>▪ Construct bioswales within the road right-of-ways within the facility drainage area</li><li>▪ Bioswales to contain native plantings and subdrains</li></ul>                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>▪ </li></ul> |
| Location in Treatment Train                                                 | Conveyance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                    |
| Target SWM Objectives                                                       | Quality Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                    |
| Technical Considerations                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                    |
| Constructability and accessibility                                          | <ul style="list-style-type: none"><li>▪ Construction area is extensive and many secondary infiltration pipes would require to be installed to achieve SWM criteria</li><li>▪ Requires coordination with existing infrastructure and utilities</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Perforated pipes (exfiltration pipes) and soakaway pits may be more suited as supplementary water quality / erosion / temperature control measures, where constructability and retrofit are least disruptive to existing infrastructure</li></ul> | <ul style="list-style-type: none"><li>▪ Construction area is extensive and pipe networks are more intricate, requiring coordination with existing infrastructure</li><li>▪ Road right of ways need to be conducive to grading and space criteria for bioswales</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Bioswales may be more suited as supplementary water quality / erosion / temperature control measures, where constructability and retrofit are least disruptive to existing infrastructure</li></ul> | <ul style="list-style-type: none"><li>▪ </li></ul> |
| Ability to meet stormwater management objective(s)                          | <ul style="list-style-type: none"><li>▪ Perforated pipes (exfiltration pipes) and soakaway pits may are more effective when used within a treatment train to achieve the stormwater objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Additional pre-treatment will enhance the function of the perforated pipes, to reduce clogging</li></ul>                                                                                                                                                                                         | <ul style="list-style-type: none"><li>▪ Bioswales are more effective when used within a treatment train to achieve the stormwater objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Additional pre-treatment will enhance the function of bioswales, to reduce clogging of the underdrain pipes</li></ul>                                                                                                                                                                                                 | <ul style="list-style-type: none"><li>▪ </li></ul> |
| Engineering best practises / innovative solution                            | <ul style="list-style-type: none"><li>▪ Perforated pipes (exfiltration pipes) and soakaway pits may are innovative solutions within stormwater management</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Enhanced with further use of LIDs such as vegetated filter strips</li></ul>                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>▪ Bioswales are innovative solutions within stormwater management conveyance systems</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Enhanced with further use of LIDs such as vegetated filter strips</li></ul>                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"><li>▪ </li></ul> |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>▪ Perforated pipes (exfiltration pipes) and soakaway pits may are effective as part of a treatment train and where retrofit does not greatly interfere with existing infrastructure</li></ul>                                                                                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"><li>▪ Bioswales are effective as part of a treatment train and where retrofit does not greatly interfere with existing infrastructure</li></ul>                                                                                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"><li>▪ </li></ul> |
| Natural Environment                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                    |
| Impacts to wildlife and vegetation habitats                                 | <ul style="list-style-type: none"><li>▪ May require removal of some vegetation depending on specific location; likely few impacts to existing wildlife and vegetation habitats</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Areas disturbed during construction will be restored</li></ul>                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"><li>▪ May require removal of some vegetation depending on specific location</li><li>▪ May present phosphorus issues if not properly designed and/or maintained</li><li>▪ Bioswales may decrease water temperature, providing benefits to the aquatic habitat of the receiving watercourse</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Planted bioswales will enhance neighbourhoods with additional vegetated areas</li></ul>                                                | <ul style="list-style-type: none"><li>▪ </li></ul> |
| Impacts / improvements based on SAR / ESA                                   | <ul style="list-style-type: none"><li>▪ Underground tanks may decrease water temperature, providing benefits to the aquatic habitat of the receiving watercourse</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Perforated pipes (exfiltration pipes) and soakaway pits may be more suited as supplementary water temperature control measures</li></ul>                                                                                                                                                                                       | <ul style="list-style-type: none"><li>▪ Bioswales may decrease water temperature, providing benefits to the aquatic habitat of the receiving watercourse</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Bioswales may be more suited as supplementary water temperature control measures</li></ul>                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>▪ </li></ul> |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>▪ Perforated pipes (exfiltration pipes) and soakaway pits present few impact on the natural environment</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>▪ Bioswales which are properly designed to avoid phosphorus loading provide positive impact on the natural environment</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                   |                                                    |
| Social Impacts                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                    |
| Requirement of easements or purchase of private lands                       | <ul style="list-style-type: none"><li>▪ To be constructed within municipal R.O.W.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Not applicable</li></ul>                                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>▪ To be constructed within municipal R.O.W.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Not applicable</li></ul>                                                                                                                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"><li>▪ </li></ul> |
| Impacts to public and private properties due to construction and operations | <ul style="list-style-type: none"><li>▪ Impacts may include temporary, minor traffic and noise issues due to construction within the residential streets</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Appropriate construction and traffic management schedule to be adhered to</li></ul>                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"><li>▪ Impacts may include temporary, minor traffic and noise issues and significant visual nuisances due to construction within the residential streets</li><li>▪ Bioswales are likely to face public opposition due to the maintenance requirements, visual disruption to an otherwise “clean”</li></ul>                                                                                                                                                                                                                              | <ul style="list-style-type: none"><li>▪ </li></ul> |

| Criteria                                | Alternatives for Uncontrolled Outlet #66                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                    |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
|                                         | Underground Storage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Bioswales                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Infiltration in Right-of-Ways (R.O.W)              |
|                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | front lawn and inconvenience of culverts under driveways<br><b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Appropriate construction and traffic management schedule to be adhered to</li></ul>                                                                                                                                                                                                                                                      |                                                    |
| Effect on public safety                 | <ul style="list-style-type: none"><li>▪ No public safety concerns beyond construction period</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Proper signage and safety measures to be set up for construction period</li></ul>                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>▪ No public safety concerns beyond construction period</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Proper signage and safety measures to be set up for construction period</li></ul>                                                                                                                                                                                                             | <ul style="list-style-type: none"><li>▪ </li></ul> |
| Summary / Recommendations               | <ul style="list-style-type: none"><li>▪ Impacts are minor and mostly temporary, within the construction period</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"><li>▪ Impacts during construction are temporary and mostly minor</li><li>▪ Long term impacts on residents due to visual impacts and culvert maintenance are significant</li></ul>                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"><li>▪ </li></ul> |
| Economic Considerations                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                    |
| Capital costs                           | <ul style="list-style-type: none"><li>▪ Moderate to high capital cost related to new pipe infrastructure, earthworks and plantings, as well as likely relocation of existing pipe infrastructure</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Proficient SUE investigation prior to design work can minimize unexpected existing pipe/utility interferences</li></ul>                                                                                                 | <ul style="list-style-type: none"><li>▪ Moderate to high capital cost related to new pipe infrastructure, earthworks and plantings, as well as likely relocation of existing pipe infrastructure</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Proficient SUE investigation prior to design work can minimize unexpected existing pipe/utility interferences</li></ul>                                                                   | <ul style="list-style-type: none"><li>▪ </li></ul> |
| Maintenance and operating costs         | <ul style="list-style-type: none"><li>▪ Low to moderate maintenance costs associated with unclogging perforated pipes</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Pre-treatment of stormwater with grassed filter strips can prevent some clogging of perforated pipes</li></ul>                                                                                                                                                                                     | <ul style="list-style-type: none"><li>▪ Low to moderate maintenance costs associated with replacing filter media, unclogging perforated pipes</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Pre-treatment of stormwater with grassed filter strips can prevent some clogging of perforated pipes</li></ul>                                                                                                                               | <ul style="list-style-type: none"><li>▪ </li></ul> |
| Impact on future development and growth | <ul style="list-style-type: none"><li>▪ Retrofit R.O.W. with perforated pipes and soakaway pits may dictate R.O.W. standards for future development</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ On-site control requirements for any future intensification within the watershed would mitigate negative impacts on the LID</li></ul>                                                                                                                                | <ul style="list-style-type: none"><li>▪ Retrofit R.O.W. with bioswales may dictate R.O.W. standards for future development</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ On-site control requirements for any future intensification within the watershed would mitigate negative impacts on the LID</li></ul>                                                                                                                           | <ul style="list-style-type: none"><li>▪ </li></ul> |
| Summary / Recommendations               | <ul style="list-style-type: none"><li>▪ Perforated pipes and soakaway pits are a moderate to high capital cost for retrofit</li></ul>                                                                                                                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"><li>▪ Bioswales are a moderate to high capital cost for retrofit but may add value to a neighbourhood</li></ul>                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>▪ </li></ul> |
| Results of Alternative Evaluation       | <ul style="list-style-type: none"><li>▪ This alternative is not preferred because infiltration in R.O.W.s cannot provide the required level of water quality and erosion control.</li><li>▪ Another alternative would need to be implemented in conjunction with infiltration in R.O.W.s in order to meet SWM objectives, making this alternative economically inefficient.</li><li>▪ The construction of infiltration pipes in R.O.W.s will create short term accessibility, visual and noise impacts on residents.</li></ul> | <ul style="list-style-type: none"><li>▪ This alternative is not preferred because bioswales cannot provide the required level of water quality and erosion control.</li><li>▪ Another alternative would need to be implemented in conjunction with bioswales in order to meet SWM objectives, making this alternative economically inefficient.</li><li>▪ The construction and maintenance of bioswales will create short and long term accessibility and visual impacts on residents.</li></ul> | <ul style="list-style-type: none"><li>▪ </li></ul> |

| Table 1 –Evaluation of Conceptual Design Alternatives for Uncontrolled Outlet #94 (Uncontrolled Area) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Criteria                                                                                              | Alternatives for Uncontrolled Outlet #94                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|                                                                                                       | Do Nothing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Oil-Grit Separators (OGS)                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Construct Water Quality Facility                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Alternative Description                                                                               | <ul style="list-style-type: none"><li>Stormwater runoff from the 100.32 ha minor drainage area will continue to be released into the receiving watercourse uncontrolled</li></ul>                                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>One (1) unit connected to the minor system prior to final control and outfall</li></ul>                                                                                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"><li>Loss of current land use including clearing of vegetation</li><li>Significant earthworks operations</li><li>Remove and replace section of sewer and outlet infrastructure</li><li>Provision of wet habitat area adjacent to receiving watercourse</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Location in Treatment Train                                                                           | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | End of Pipe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Target SWM Objective(s)                                                                               | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Quality Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Technical Considerations                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Constructability and accessibility                                                                    | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"><li>Locations are accessible as OGS units could be installed upstream of the outfalls at manholes within municipal roadways; construction area is relatively small</li><li>Construction considerations include traffic interruptions and short term road closures</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Traffic management plans may reduce inconveniences associated with construction</li></ul> | <ul style="list-style-type: none"><li>The site is adjacent to a recreational park and is along a public access trail</li><li>Redirection of servicing will be required to outlet to constructed wet pond</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Safety precautions including signage and fencing would be required since the construction site would be within a public park</li></ul>                                                                                                                                                                                                                                                                              |
| Ability to meet stormwater management objective(s)                                                    | <ul style="list-style-type: none"><li>Does not provide for or meet the stormwater management objectives of the City and/or TRCA for water quality, erosion or quantity control</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul>                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>OGS units may be able to provide all required stormwater quality objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Pre-treatment of stormwater runoff with LIDs will enhance the performance of the OGS</li></ul>                                                                                                                                                                              | <ul style="list-style-type: none"><li>A wet pond facility would be capable of partially or fully meeting the requirements for quality control, depending if a facility for the full required volume can be accommodated</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>A wet pond facility for quantity control could be constructed to include active storage capacity that will provide quantity and erosion control within a single footprint; however space is limited and this is not a realistic enhancement</li><li>Quality control can be enhanced with LIDs that infiltrate runoff within the drainage area</li></ul>                                              |
| Engineering best practises / innovative solution                                                      | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"><li>OGS and similar units are noted as best management practices</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Pre-treatment of stormwater runoff with LIDs will enhance the performance of the OGS</li></ul>                                                                                                                                                                                             | <ul style="list-style-type: none"><li>Typically more traditional SWM approach</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Quality control can be enhanced with LIDs that infiltrate runoff within the drainage area</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Summary / Recommendations                                                                             | <ul style="list-style-type: none"><li>Does not provide for or meet the stormwater management objectives of the City and/or TRCA for water quality, erosion or quantity control</li></ul>                                                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"><li>OGS can be effective, low-space option to provide water quality control</li></ul>                                                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>Technically feasible; however, full permanent pool volume may not be accommodated within the available space</li><li>Construction of a surface detention facility can fully meet the quality control SWM criteria</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Natural Environment                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Impacts to wildlife and vegetation habitats                                                           | <ul style="list-style-type: none"><li>Current condition of wildlife and vegetation habitats will not change; however if the release rate of uncontrolled stormwater into the receiving watercourse causes future erosion in the watercourse or impacts the quality of the water in the watercourse, this could have negative impact on the future condition of wildlife and vegetation habitats</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li><li></li></ul> | <ul style="list-style-type: none"><li>OGS does not physically interfere with the existing outlet or impact the surrounding forested area and improves water quality prior to discharge to the watercourse</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation required</li></ul>                                                                                                                                                    | <ul style="list-style-type: none"><li>Existing vegetation will be cleared including a few adult trees in the park land.</li><li>There are opportunities to improve the habitat quality of the receiving watercourse by reducing the sediment loading and potential contaminate exposure of the receiving watercourse</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Restoration plans will be developed to restore the surrounding areas impacted by construction</li><li>Riparian and aquatic vegetation can be planted on the berms and within the wet pond facility which will also aid in reducing the temperature impacts of the surface detention of runoff</li></ul> |
| Impacts / improvements based on SAR / ESA                                                             | <ul style="list-style-type: none"><li>Existing vegetation provides some benefit to reducing water temperature</li><li>By not implementing temperature controls, receiving waters may have higher temperatures over time and this can negatively impact sensitive species such as Redside Dace</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul>                                                                                                            | <ul style="list-style-type: none"><li>Meeting water quality criteria will improve water quality of downstream receiving waters</li><li>Little to no effect on temperature mitigation</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Use of OGS can be enhanced with pre-treatment using LIDs throughout minor system watershed</li></ul>                                                                                                     | <ul style="list-style-type: none"><li>There are opportunities to improve the habitat quality of the receiving watercourse by reducing the sediment loading of the watercourse</li><li>Wet ponds can provide reduction of stormwater temperature with the inclusion of a bottom draw outlet and shading from vegetation</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Further consultation with the MNR regarding SAR will occur prior to the detailed design of the retrofit</li><li>Stringent construction practices can be</li></ul>                                                                                                                                     |



| Criteria                                                                    | Alternatives for Uncontrolled Outlet #94                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                             | Do Nothing                                                                                                                                                                          | Oil-Grit Separators (OGS)                                                                                                                                                                                                                                                                                                                                                                                                                       | Construct Water Quality Facility                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|                                                                             |                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                 | implemented to reduce the possibility of introducing invasive species to the ecosystem during construction                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>Over time, increasing erosion and water temperatures decrease water quality and affect the health of vegetation and aquatic species</li></ul> | <ul style="list-style-type: none"><li>OGS offers improvements to water quality</li><li>Used in conjunction with LIDs, OGS can improve water conditions for SAR</li></ul>                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"><li>A wet pond can be beneficial to downstream receiving waters but will alter any existing habitat within the construction area</li></ul>                                                                                                                                                                                                                                                                                                                                                                  |
| Social Impacts                                                              |                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Requirement of easements or purchase of private lands                       | N/A                                                                                                                                                                                 | <ul style="list-style-type: none"><li>Not required; preference to install and maintain OGS within municipal R.O.W., where maintenance is easily accessible</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                                                                                                                                         | <ul style="list-style-type: none"><li>Not a reasonable alternative for the construction and maintenance of a SWM facility for UC #94</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Land requirements would be confirmed through conceptual design</li></ul>                                                                                                                                                                                                                             |
| Impacts to public and private properties due to construction and operations | N/A                                                                                                                                                                                 | <ul style="list-style-type: none"><li>Roadway interference and/or short-term closure would be expected for the installation of OGS units</li><li>Temporary interference to be expected on roadways during maintenance (approximately once a year)</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Traffic management plans may reduce inconveniences associated with construction</li></ul> | <ul style="list-style-type: none"><li>Noise and visual impacts associated with construction for the residences backing onto proposed SWM facility block</li><li>A construction staging area may need to be set up at north side of the recreational park or within the construction area</li><li>The SWM facility would be built on public recreational park land</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Construction management plan, including restrictions on hours</li></ul> |
| Effect on public safety                                                     | N/A                                                                                                                                                                                 | <ul style="list-style-type: none"><li>Installed OGS does not pose threats to public safety</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul>                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>By building to the required side slope and depth criteria, the wet pond facility should not pose a threat to public safety</li><li>There is a trail though this green space adjacent to the proposed facility</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Flattened slopes, warning signs, and fencing (if required) can provide measures of safety</li></ul>                                                                                   |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>The ‘Do Nothing’ alternative has no social impacts</li></ul>                                                                                  | <ul style="list-style-type: none"><li>OGS presents few and short-term impacts associated with installation and maintenance</li></ul>                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"><li>Construction of a wet pond facility would be a longer-term construction project with potential noise, traffic and visual impacts</li><li>Loss of public park space</li><li>Potential hazard to public after construction is complete</li></ul>                                                                                                                                                                                                                                                          |
| Economic Considerations                                                     |                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Capital costs                                                               | N/A                                                                                                                                                                                 | <ul style="list-style-type: none"><li>Relatively low capital cost for installation of one (1) unit and associated infrastructure works</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Capital cost of OGS units can be reduced if stormwater is pre-treated with LIDs (thus scaling down required OGS size)</li></ul>                                                                      | <ul style="list-style-type: none"><li>Moderate capital cost for earthworks, grading, infrastructure components and permits</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Capital costs can be marginally reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required quality control volumes and footprint)</li></ul>                                                                                                                           |
| Maintenance and operating costs                                             | N/A                                                                                                                                                                                 | <ul style="list-style-type: none"><li>Fairly low maintenance cost and frequency; approximately annually</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Maintenance frequency of OGS units should not decrease with increased pre-treatment</li></ul>                                                                                                                                       | <ul style="list-style-type: none"><li>Moderate maintenance cost and frequency; likely seasonally</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Maintenance frequency should be as directed by operations manual</li><li>Maintenance frequency can be reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required quality control volume)</li></ul>                                                                                              |
| Impact on future development and growth                                     | N/A                                                                                                                                                                                 | <ul style="list-style-type: none"><li>Size of OGS is static once installed and would require upgrading if a larger drainage area is directed to it (in order to meet water quality criteria)</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Additional OGS units may be installed in the future to correspond with growth</li></ul>                                                        | <ul style="list-style-type: none"><li>No impact, but detention facility would require expansion if contributing land use was to intensify</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>On-site control requirements for any intensified development within the facility’s watershed would mitigate further expansion</li></ul>                                                                                                                                                         |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>‘Do nothing’ may postpone required works and increase future costs</li></ul>                                                                  | <ul style="list-style-type: none"><li>Installation of OGS units is a low to medium cost solution for achievement of most of the required SWM criteria</li></ul>                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"><li>Construction of a wet pond facility would present moderate capital costs for achievement of quality control</li></ul>                                                                                                                                                                                                                                                                                                                                                                                   |
| Results of Alternative Evaluation                                           | <ul style="list-style-type: none"><li>This alternative is not preferred because the alternative does not meet the stormwater management objectives</li></ul>                        | <ul style="list-style-type: none"><li>This is a preferred alternative due to the lower cost, small disturbance area and ability to provide full quality control</li><li>This alternative can be implemented with little to no loss of existing trees.</li></ul>                                                                                                                                                                                 | <ul style="list-style-type: none"><li>A wet pond facility would be capable of fully meeting the requirements for quality control</li><li>This is not a preferred option because of the loss of public park space and the hazard potential</li></ul>                                                                                                                                                                                                                                                                                           |

| Criteria                                           | Alternatives for Uncontrolled Outlet #94                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                    | Construct Extended Detention Facility                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Underground Storage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Aquatic and Riparian Plantings at Facility                                                                                                                                                                                                                                                                                                                                                                                                |
| Alternative Description                            | <ul style="list-style-type: none"> <li>Loss of current land use including clearing of vegetation</li> <li>Significant earthworks</li> <li>Remove and replace section of existing sewer and outlet infrastructure</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"> <li>Installed at proposed pond block location</li> <li>Underground storage tanks will capture and detain stormwater and release over an extended time period</li> <li>Infiltration type underground tanks will allow for infiltration during detention period</li> <li>May need water quality control prior to infiltrating (if proposed)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Plantings to increase density and area of vegetation cover surrounding facility and within facility to provide shade for cooling of detained water</li> <li>Only applicable to surface SWM facilities</li> </ul>                                                                                                                                                                                   |
| Location in Treatment Train                        | End of Pipe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Target SWM Objectives                              | Erosion Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Erosion and Temperature Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Temperature Control                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Technical Considerations                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Constructability and accessibility                 | <ul style="list-style-type: none"> <li>The site is adjacent to a recreational park and is along a public access trail</li> <li>Redirection of servicing will be required to outlet to constructed extended detention facility</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Safety precautions including signage and fencing would be required since the construction site would be within a public park</li> </ul>                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"> <li>Footprint may be large but is constructible within municipally owned pond block lands; constructability is low to moderate</li> <li>Still allows for use of land at-grade</li> <li>May require re-organization of existing outlets to feed into central underground tanks</li> <li>Based on soil mapping, the drainage area is conducive to infiltration</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Tanks with infiltration capabilities provide additional benefits to erosion and temperature control</li> <li>Constructability would likely be increased by incorporating several underground tanks rather than one central system</li> <li>Site specific soil testing is required to confirm suitability of infiltration</li> </ul> | <ul style="list-style-type: none"> <li>No constructability issues anticipated with adding plantings to proposed facilities</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Plantings enhance temperature control by providing shade</li> <li>Surface SWM facilities not suggested for this site, therefore aquatic plantings will not likely be a solution for this site</li> </ul> |
| Ability to meet stormwater management objective(s) | <ul style="list-style-type: none"> <li>An extended detention facility would be capable of partially or fully meeting the requirements for erosion control, depending if a facility for the full required volume can be accommodated</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>An extended detention facility for erosion control could be constructed to include quality control capacity that will provide quality and erosion control within a single footprint; however space is limited and this is not a realistic enhancement</li> <li>Erosion control can be enhanced with LIDs that infiltrate runoff within the drainage area</li> </ul>                                                                                | <ul style="list-style-type: none"> <li>Underground tanks, especially with infiltration capabilities, are effective for providing quantity, quality and erosion control</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Longer detention times can enhance the erosion control</li> <li>Underground storage tanks to be designed to provide quantity control</li> <li>Infiltration type underground tanks will allow for infiltration during detention period</li> <li>May need water quality control prior to infiltrating (if proposed)</li> </ul>                                                                                                                                                                                                                                 | <ul style="list-style-type: none"> <li>Shade from plantings will reduce the temperature of stormwater at a facility</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Plantings are better used in conjunction with other cooling methods to achieve adequate temperature control</li> </ul>                                                                                          |
| Engineering best practises / innovative solution   | <ul style="list-style-type: none"> <li>Typically more traditional SWM approach</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Erosion control can be enhanced with LIDs that infiltrate runoff within the drainage area</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>Underground tanks, including infiltration, are noted as best management practices</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Maintenance of underground tanks is more extensive than at-grade alternatives</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Temperature control of stormwater in general is becoming an engineering best management practice in areas with sensitive habitats</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Effects of plantings can be enhanced with other methods such as use of a bottom draw outlet</li> </ul>                                                     |
| Summary / Recommendations                          | <ul style="list-style-type: none"> <li>Technically feasible; however, full erosion control volume may not be accommodated within the available space</li> <li>Construction of an extended detention facility can fully meet the erosion control SWM criteria</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"> <li>Technically feasible, requiring more intrusive maintenance</li> <li>Useful for maintaining land uses at-grade and visually not intrusive</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>Plantings at stormwater management facility are a simple alternative to provide additional temperature controls</li> </ul>                                                                                                                                                                                                                                                                         |
| Natural Environment                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Impacts to wildlife and vegetation habitats        | <ul style="list-style-type: none"> <li>Existing vegetation will be cleared including a portion of the forest which includes a few adult trees in park land.</li> <li>Results in a loss of terrestrial habitat</li> <li>There are opportunities to improve the habitat quality of the receiving watercourse by reducing the peak flows entering the watercourse and thereby reducing erosion</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Restoration plans will be developed to restore the surrounding areas impacted by construction</li> <li>Vegetation can be planted on the perimeter of the extended detention facility which will also aid in reducing the temperature impacts of the surface detention of runoff</li> </ul> | <ul style="list-style-type: none"> <li>May require removal of some vegetation depending on specific location</li> <li>Once installed, less intrusive than other alternatives because of location below grade</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Restoration plan required if loss of vegetation expected due to construction</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>Planting native species can enhance the existing wildlife and vegetation</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>No mitigation undertaken</li> </ul>                                                                                                                                                                                 |
| Impacts / improvements based on SAR / ESA          | <ul style="list-style-type: none"> <li>There are opportunities to improve the habitat quality of the receiving watercourse by reducing the erosion and thereby sediment loading of the receiving</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"> <li>Underground tanks may improve the habitat quality of the receiving watercourse by reducing the erosion and thereby sediment loading of the receiving watercourse</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>Providing additional shade at stormwater facilities reduces stormwater temperature which is a key benefit for Redside Dace Habitat</li> </ul>                                                                                                                                                                                                                                                      |

| Criteria                                                                           | Alternatives for Uncontrolled Outlet #94                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                    |
|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                    | Construct Extended Detention Facility                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Underground Storage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Aquatic and Riparian Plantings at Facility                                                                                                                                                                                                                                                                         |
|                                                                                    | watercourse <ul style="list-style-type: none"> <li>The receiving watercourse has been identified as possible Redside Dace habitat</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Further consultation with the MNR regarding SAR will occur prior to the detailed design of the retrofit</li> <li>Stringent construction practices can be implemented to reduce the possibility of introducing invasive species to the ecosystem during construction</li> </ul> | <ul style="list-style-type: none"> <li>The receiving watercourse has been identified to be possible Redside Dace habitat</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Further consultation with the MNR regarding SAR will occur prior to the detailed design of the retrofit</li> <li>Stringent construction practices can be implemented to reduce the possibility of introducing invasive species to the ecosystem during construction</li> </ul> | <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Effects of plantings can be enhanced with other methods such as use of a bottom draw outlet</li> <li>Further consultation with the MNR regarding SAR will occur prior to the detailed design of the retrofit</li> </ul> |
| <b>Summary / Recommendations</b>                                                   | <ul style="list-style-type: none"> <li>A extended detention facility can be beneficial to downstream receiving waters but will alter any existing habitat within the construction area</li> </ul>                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"> <li>Underground tanks are a long-term non-invasive alternative for providing quantity, quality and erosion control</li> </ul>                                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"> <li>Plantings at stormwater facilities provide positive impacts on the natural environment (provided they are non-invasive species)</li> </ul>                                                                                                                                  |
| <b>Social Impacts</b>                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                    |
| <b>Requirement of easements or purchase of private lands</b>                       | <ul style="list-style-type: none"> <li>Not a reasonable alternative for the construction and maintenance of a SWM facility for UC #94</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Land requirements would be confirmed through conceptual design</li> </ul>                                                                                                                                                                                                  | <ul style="list-style-type: none"> <li>Not a reasonable alternative for the construction and maintenance of an underground storage tank facility for UC #94</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Land requirements would be confirmed through conceptual design</li> </ul>                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Not applicable (unless required in conjunction with stormwater facility construction)</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not applicable</li> </ul>                                                       |
| <b>Impacts to public and private properties due to construction and operations</b> | <ul style="list-style-type: none"> <li>Noise and visual impacts associated with construction for the residences backing onto proposed SWM facility block</li> <li>A construction staging area may need to be set up at north side of the recreational park or within the construction area</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Construction management plan, including restrictions on hours</li> </ul>                                              | <ul style="list-style-type: none"> <li>Noise and visual impacts associated with construction for the residences backing onto proposed SWM facility block</li> <li>A construction staging area may need to be set up at north side of the recreational park or within the construction area</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Construction management plan, including restrictions on hours</li> </ul>                                     | N/A                                                                                                                                                                                                                                                                                                                |
| <b>Effect on public safety</b>                                                     | <ul style="list-style-type: none"> <li>By building to the required slope and depth criteria, the extended detention facility should not pose a threat to public safety</li> <li>There is a trail though this green space adjacent to the proposed facility</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Adequate slopes, warning signs, and fencing (if required) can provide measures of safety</li> </ul>                                                   | <ul style="list-style-type: none"> <li>No public safety concerns beyond construction period</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Proper signage and safety measures to be set up for construction period</li> </ul>                                                                                                                                                                                                                          | <ul style="list-style-type: none"> <li>Vegetation should be suitable for proposed facility and clearly indicate any water’s edge</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Vegetation at facilities must be maintained</li> </ul>                      |
| <b>Summary / Recommendations</b>                                                   | <ul style="list-style-type: none"> <li>Construction of an extended detention facility would be a longer-term construction project with potential noise, traffic and visual impacts</li> </ul>                                                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"> <li>Underground tanks are proposed to be located in the pond block; not intrusive to the public after construction</li> </ul>                                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"> <li>No significant social impacts of plantings at stormwater facilities</li> </ul>                                                                                                                                                                                              |
| <b>Economic Considerations</b>                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                    |
| <b>Capital costs</b>                                                               | <ul style="list-style-type: none"> <li>Moderate cost for earthworks, grading, infrastructure components, permits</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Capital costs can be marginally reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required detention volumes)</li> </ul>                                                                                                                               | <ul style="list-style-type: none"> <li>Moderate capital cost related to storage tank infrastructure</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Efficient tank design to minimize capital costs</li> </ul>                                                                                                                                                                                                                                          | <ul style="list-style-type: none"> <li>Low capital cost relative to other alternatives</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Costs may vary depending on extents and types of plantings</li> </ul>                                                 |
| <b>Maintenance and operating costs</b>                                             | <ul style="list-style-type: none"> <li>Lower maintenance cost and frequency; likely every few years</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Maintenance frequency should be as directed by operations manual</li> <li>Maintenance frequency can be reduced by providing pre-treatment for sediment removal</li> </ul>                                                                                                                                    | <ul style="list-style-type: none"> <li>Low maintenance costs associated with cleaning out tanks as per operations manual or in event of clogging</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Can prevent clogging with additional pre-treatment techniques</li> </ul>                                                                                                                                                                               | <ul style="list-style-type: none"> <li>Low maintenance costs with native, sustainable plantings</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Lower maintenance plants will minimize costs of maintenance and/or replanting</li> </ul>                     |
| <b>Impact on future development and growth</b>                                     | <ul style="list-style-type: none"> <li>No impact, but extended detention facility would require expansion if contributing land use was to intensify</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>On-site control requirements for any intensified development within the facility’s watershed would mitigate further expansion</li> </ul>                                                                                                                     | <ul style="list-style-type: none"> <li>No impact, but underground tanks would require expansion if contributing land use was to intensify</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>On-site control requirements for any future intensification within the watershed would mitigate further expansion</li> </ul>                                                                                                                                  | N/A                                                                                                                                                                                                                                                                                                                |
| <b>Summary / Recommendations</b>                                                   | <ul style="list-style-type: none"> <li>Construction of an extended detention facility would present moderate capital costs for achievement of quantity control</li> </ul>                                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"> <li>Underground tanks provide moderate to high capital and maintenance costs for the achievement of quantity, quality and erosion control</li> <li>A larger footprint may be required with the use of this alternative</li> </ul>                                                                                                                                                                                                                                          | <ul style="list-style-type: none"> <li>Plantings at SWM facilities are a low cost alternative for providing temperature control</li> </ul>                                                                                                                                                                         |
| <b>Results of Alternative Evaluation</b>                                           | <ul style="list-style-type: none"> <li>This is not a preferred option because there is not enough space to build an adequately sized facility for the required erosion control</li> </ul>                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"> <li>This is a preferred alternative because public recreational land can be restored after construction of an underground storage tank as compared to a pond. This alternative would be constructed such that it minimizes the number</li> </ul>                                                                                                                                                                                                                           | <ul style="list-style-type: none"> <li>Due to the other selected preferred options being below ground, the water is unaffected by the warming effects of the sun. Therefore, further temperature mitigation is not required at UC #94.</li> </ul>                                                                  |

| Criteria | Alternatives for Uncontrolled Outlet #94 |                          |                                            |
|----------|------------------------------------------|--------------------------|--------------------------------------------|
|          | Construct Extended Detention Facility    | Underground Storage      | Aquatic and Riparian Plantings at Facility |
|          |                                          | of adult trees affected. |                                            |



| Criteria                                              | Alternatives for Uncontrolled Outlet #94                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                       | Bioswales                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Infiltration in Right-of-Ways (R.O.W.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Bottom Draw Outlet in a Wet Pond                                                                                                                                                                                                                                                                                                                                                                                                        |
| Alternative Description                               | <ul style="list-style-type: none"><li>Construct bioswales within the road right-of-ways within the facility drainage area</li><li>Bioswales to contain native plantings and subdrains</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"><li>Install perforated secondary pipe within existing storm sewer systems to allow for infiltration through linear soakaway pits</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"><li>Construct a bottom draw outlet to reduce temperatures of discharged water.</li><li>Only applicable if the wetland is converted into a wet pond</li></ul>                                                                                                                                                                                                                                          |
| Location in Treatment Train                           | Conveyance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | End of Pipe                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Target SWM Objective(s)                               | Quality, Erosion and Temperature Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Temperature Control                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Technical Considerations                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Constructability and accessibility                    | <ul style="list-style-type: none"><li>Construction area is extensive and pipe networks are more intricate, requiring coordination with existing infrastructure</li><li>Road right of ways need to be conducive to grading and space criteria for bioswales</li><li>Based on soil mapping, the soil in the drainage area is conducive to infiltration</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Bioswales may be more suited as supplementary water quality / erosion / temperature control measures, where constructability and retrofit are least disruptive to existing infrastructure</li><li>Site specific soil testing is required to confirm suitability of infiltration</li></ul> | <ul style="list-style-type: none"><li>Construction area is extensive and many secondary infiltration pipes would require to be installed to achieve SWM criteria</li><li>Requires coordination with existing infrastructure and utilities</li><li>Based on soil mapping, the soil in the drainage area is conducive to infiltration</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may be more suited as supplementary water quality / erosion / temperature control measures, where constructability and retrofit are least disruptive to existing infrastructure</li><li>Site specific soil testing is required to confirm suitability of infiltration</li></ul> | <ul style="list-style-type: none"><li>Constructability is simple, pending adequate depth of the wet pond</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Greater depth enhances the thermal mitigation function of the bottom draw outlet</li><li>Since a wet pond is not the preferred alternative for this site, a bottom draw outlet is also not likely to be suitable</li></ul> |
| Ability to meet stormwater management objective(s)    | <ul style="list-style-type: none"><li>Bioswales are more effective when used within a treatment train to achieve the stormwater objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Additional pre-treatment will enhance the function of bioswales, to reduce clogging of the underdrain pipes</li></ul>                                                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may are more effective when used within a treatment train to achieve the stormwater objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Additional pre-treatment will enhance the function of the perforated pipes, to reduce clogging</li></ul>                                                                                                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"><li>Bottom draw outlets can be effective in decreasing the temperature of the outlet water</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Thermal mitigation would be best achieved with a combination of LID methods</li></ul>                                                                                                                  |
| Engineering best practises / innovative solution      | <ul style="list-style-type: none"><li>Bioswales are innovative solutions within stormwater management conveyance systems</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Enhanced with further use of LIDs such as vegetated filter strips</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may are innovative solutions within stormwater management</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Enhanced with further use of LIDs such as vegetated filter strips</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"><li>Bottom draw outlets in combination with cooling trenches are recent best management practices</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Thermal mitigation can be enhanced overall with LIDs within the contributing watershed</li></ul>                                                                                                |
| Summary / Recommendations                             | <ul style="list-style-type: none"><li>Bioswales are effective as part of a treatment train and where retrofit does not greatly interfere with existing infrastructure</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may are effective as part of a treatment train and where retrofit does not greatly interfere with existing infrastructure</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>A bottom draw outlet is a recommended outlet alternative for the wet pond to achieve required temperature control</li></ul>                                                                                                                                                                                                                                                                       |
| Natural Environment                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Impacts to wildlife and vegetation habitats           | <ul style="list-style-type: none"><li>May require removal of some vegetation depending on specific location</li><li>May present phosphorus issues if not properly designed and/or maintained</li><li>Bioswales may decrease water temperature, providing benefits to the aquatic habitat of the receiving watercourse</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Planted bioswales will enhance neighbourhoods with additional vegetated areas</li></ul>                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>May require removal of some vegetation depending on specific location; likely few impacts to existing wildlife and vegetation habitats</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Areas disturbed during construction will be restored.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>No impact to vegetation</li><li>May impact aquatic habitat; requires appropriate measures to avoid harm to fish</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Effects could be mitigated with appropriate screens and outflow velocities</li></ul>                                                                                          |
| Impacts / improvements based on SAR / ESA             | <ul style="list-style-type: none"><li>Bioswales may decrease water temperature, providing benefits to the aquatic habitat of the receiving watercourse including Redside Dace.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Bioswales may be more suited as supplementary water temperature control measures</li></ul>                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>Underground tanks may decrease water temperature, providing benefits to the aquatic habitat of the receiving watercourse including Redside Dace.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may be more suited as supplementary water temperature control measures</li></ul>                                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"><li>Cooling effects are very beneficial for Redside Dace habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Alternative can be enhanced with LIDs within the watershed and planting techniques within the wet pond</li></ul>                                                                                                                 |
| Summary / Recommendations                             | <ul style="list-style-type: none"><li>Bioswales that are properly designed to avoid phosphorus loading provide positive impact on the natural environment</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits present few impact on the natural environment</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>Bottom draw outlet is a simple alternative to incorporate into a wet pond for the achievement of temperature control</li></ul>                                                                                                                                                                                                                                                                    |
| Social Impacts                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Requirement of easements or purchase of private lands | <ul style="list-style-type: none"><li>To be constructed within municipal R.O.W.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"><li>To be constructed within municipal R.O.W.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Impacts to public and private                         | <ul style="list-style-type: none"><li>Impacts may include temporary, minor traffic and noise issues and significant visual</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>Impacts may include temporary, minor traffic and noise issues due to construction within the</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"><li>Impacts are related to the construction of the wet pond</li></ul>                                                                                                                                                                                                                                                                                                                                 |

| Criteria                                      | Alternatives for Uncontrolled Outlet #94                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                            |
|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                               | Bioswales                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Infiltration in Right-of-Ways (R.O.W.)                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Bottom Draw Outlet in a Wet Pond                                                                                                                                                                                                           |
| properties due to construction and operations | <div>nuisances due to construction within the residential streets</div> <div><div></div>Bioswales are likely to face public opposition due to the maintenance requirements, visual disruption to an otherwise “clean” front lawn and inconvenience of culverts under driveways</div> <div>Mitigation/Compensation/Enhancement Measures</div> <div><div></div>Appropriate construction and traffic management schedule to be adhered to</div>                | <div>residential streets</div> <div>Mitigation/Compensation/Enhancement Measures</div> <div><div></div>Appropriate construction and traffic management schedule to be adhered to</div>                                                                                                                                                                                                                                                                                                    | <div>Mitigation/Compensation/Enhancement Measures</div> <div><div></div>Bottom draw outlet itself does not present additional impacts</div>                                                                                                |
| Effect on public safety                       | <div>No public safety concerns beyond construction period</div> <div>Mitigation/Compensation/Enhancement Measures</div> <div><div></div>Proper signage and safety measures to be set up for construction period</div>                                                                                                                                                                                                                                       | <div>No public safety concerns beyond construction period</div> <div>Mitigation/Compensation/Enhancement Measures</div> <div><div></div>Proper signage and safety measures to be set up for construction period</div>                                                                                                                                                                                                                                                                     | N/A                                                                                                                                                                                                                                        |
| Summary / Recommendations                     | <div>Impacts during construction are temporary and mostly minor</div> <div>Long term impacts on residents due to visual impacts and culvert maintenance are significant</div>                                                                                                                                                                                                                                                                               | <div>Impacts are minor and mostly temporary, within the construction period</div>                                                                                                                                                                                                                                                                                                                                                                                                         | <div>There are no social impacts associated with the bottom draw outlet</div>                                                                                                                                                              |
| Economic Considerations                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                            |
| Capital costs                                 | <div>Moderate to high capital cost related to new pipe infrastructure, earthworks and plantings, as well as likely relocation of existing pipe infrastructure</div> <div>Mitigation/Compensation/Enhancement Measures</div> <div><div></div>Proficient SUE investigation prior to design work can minimize unexpected existing pipe/utility interferences</div>                                                                                             | <div>Moderate to high capital cost related to new pipe infrastructure, earthworks and plantings, as well as likely relocation of existing pipe infrastructure</div> <div>Mitigation/Compensation/Enhancement Measures</div> <div><div></div>Proficient SUE investigation prior to design work can minimize unexpected existing pipe/utility interferences</div>                                                                                                                           | <div>Low capital cost as standalone item</div> <div>Mitigation/Compensation/Enhancement Measures</div> <div><div></div>No mitigation required</div>                                                                                        |
| Maintenance and operating costs               | <div>Low to moderate maintenance costs associated with replacing filter media, unclogging perforated pipes</div> <div>Mitigation/Compensation/Enhancement Measures</div> <div><div></div>Pre-treatment of stormwater with grassed filter strips can prevent some clogging of perforated pipes</div>                                                                                                                                                         | <div>Low to moderate maintenance costs associated with unclogging perforated pipes</div> <div>Mitigation/Compensation/Enhancement Measures</div> <div><div></div>Pre-treatment of stormwater with grassed filter strips can prevent some clogging of perforated pipes</div>                                                                                                                                                                                                               | <div>Low maintenance costs as standalone; costs associated with maintenance of wet pond</div> <div>Mitigation/Compensation/Enhancement Measures</div> <div><div></div>Maintenance due to clogging can be reduced with proper screens</div> |
| Impact on future development and growth       | <div>Retrofit R.O.W. with bioswales may dictate R.O.W. standards for future development</div> <div>Mitigation/Compensation/Enhancement Measures</div> <div><div></div>On-site control requirements for any future intensification within the watershed would mitigate negative impacts on the LID</div>                                                                                                                                                     | <div>Retrofit R.O.W. with perforated pipes and soakaway pits may dictate R.O.W. standards for future development</div> <div>Mitigation/Compensation/Enhancement Measures</div> <div><div></div>On-site control requirements for any future intensification within the watershed would mitigate negative impacts on the LID</div>                                                                                                                                                          | N/A                                                                                                                                                                                                                                        |
| Summary / Recommendations                     | <div>Bioswales are a moderate to high capital cost for retrofit but may add value to a neighbourhood</div>                                                                                                                                                                                                                                                                                                                                                  | <div>Perforated pipes and soakaway pits are a moderate to high capital cost for retrofit</div>                                                                                                                                                                                                                                                                                                                                                                                            | <div>Bottom draw outlet is a cost effective alternative to incorporate into wet pond design to meet temperature criteria</div>                                                                                                             |
| Results of Alternative Evaluation             | <div>This alternative is not preferred because bioswales cannot provide the required level of water quality and erosion control.</div> <div>Another alternative would need to be implemented in conjunction with bioswales in order to meet SWM objectives, making this alternative economically inefficient.</div> <div>The construction and maintenance of bioswales will create short and long term accessibility and visual impacts on residents.</div> | <div>This alternative is not preferred because infiltration in R.O.W.s cannot provide the required level of water quality and erosion control.</div> <div>Another alternative would need to be implemented in conjunction with infiltration in R.O.W.s in order to meet SWM objectives, making this alternative economically inefficient.</div> <div>The construction of infiltration pipes in R.O.W.s will create short term accessibility, visual and noise impacts on residents.</div> | <div>This alternative is not preferred because a wet pond is not a preferred option for this site</div>                                                                                                                                    |

| Criteria                                              | Alternatives for Pond #94                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                  |  |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|--|
|                                                       | Cooling Trench                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                  |  |
| Alternative Description                               | <ul style="list-style-type: none"><li>Excavation of a trench between the pond control structure maintenance hole and the outlet</li><li>Modification of outlet piping infrastructure to discharge into trench</li><li>Installation of stone material and restoration of ground surface</li></ul>                                                                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li></li></ul> |  |
| Location in Treatment Train                           | End of Pipe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                  |  |
| Target SWM Objective(s)                               | Temperature Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                  |  |
| Technical Considerations                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                  |  |
| Constructability and accessibility                    | <ul style="list-style-type: none"><li>Feasible construction and accessibility is adequate</li><li>Construction footprint is relatively small, however land area is also limited at this site</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Erosion and sediment control plans required</li></ul>                                                                                                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"><li></li></ul> |  |
| Ability to meet stormwater management objective(s)    | <ul style="list-style-type: none"><li>Cooling trenches can be effective in decreasing the temperature of the outlet water</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Thermal mitigation would be best achieved with a combination of LID methods</li></ul>                                                                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"><li></li></ul> |  |
| Engineering best practises / innovative solution      | <ul style="list-style-type: none"><li>Cooling trenches are a recent best management practice</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Thermal mitigation can be enhanced overall with LIDs within the contributing watershed</li></ul>                                                                                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"><li></li></ul> |  |
| Summary / Recommendations                             | <ul style="list-style-type: none"><li>Technically feasible with a relatively small construction footprint, however land space may still be an issue</li><li>A cooling trench would help with mitigating the temperature impacts of the SWM pond</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li></li></ul> |  |
| Natural Environment                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                  |  |
| Impacts to wildlife and vegetation habitats           | <ul style="list-style-type: none"><li>Existing vegetation in the work area will be cleared</li><li>All effected areas will be restored and can be planted to replace removed vegetation</li><li>Reduction of temperature released into the downstream cool-water watercourse will improve the native aquatic habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Appropriate erosion and sediment control measures will be undertaken during construction to reduce any negative impacts to the downstream watercourse</li><li>Restoration plans will be developed to restore the surrounding areas impacted by construction</li></ul> | <ul style="list-style-type: none"><li></li></ul> |  |
| Impacts / improvements based on SAR / ESA             | <ul style="list-style-type: none"><li>There are opportunities to improve the habitat quality of the receiving watercourse by reducing the temperature of flows entering the watercourse</li><li>Cooling effects are very beneficial for Redside Dace habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Effects could be mitigated with appropriate screens and outflow velocities</li><li>Further consultation with the MNR regarding SAR will occur prior to the detailed design of the retrofit</li></ul>                                                                                                                          | <ul style="list-style-type: none"><li></li></ul> |  |
| Summary / Recommendations                             | <ul style="list-style-type: none"><li>A cooling trench at the pond outlet is a relatively simple alternative to mitigate temperatures impacts of the wet pond for the achievement of temperature control</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"><li></li></ul> |  |
| Social Impacts                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                  |  |
| Requirement of easements or purchase of private lands | <ul style="list-style-type: none"><li>Purchase of private lands is not a suggested alternative for construction of a cooling trench at this site</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li></li></ul> |  |
| Impacts to public and private properties due to       | <ul style="list-style-type: none"><li>Noise and visual impacts associated with construction for the residences backing onto proposed SWM facility block</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                  |  |

| Criteria                                | Alternatives for Pond #94                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                  |  |
|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|--|
|                                         | Cooling Trench                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                  |  |
| construction and operations             | <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Construction management plan, including restrictions on hours may reduce inconveniences associated with construction</li></ul>                                                                                                                                                                                                                                                     |                                                  |  |
| Effect on public safety                 | <ul style="list-style-type: none"><li>The cooling trench will not have any affects on public safety once constructed</li><li>During construction there is a potential safety risk due to excavation if a member of the public was to enter the site</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>The construction site should be secured during and after construction hours with warning signs and fencing</li></ul> | <ul style="list-style-type: none"><li></li></ul> |  |
| Summary / Recommendations               | <ul style="list-style-type: none"><li>There are no long term social impacts associated with the cooling trench</li><li>Minimal disturbance to the public may occur during construction but the construction time frame will be brief</li></ul>                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li></li></ul> |  |
| Economic Considerations                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                  |  |
| Capital costs                           | <ul style="list-style-type: none"><li>Low capital cost for a relatively small excavation and materials</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Capital costs can be marginally reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required trench volume)</li></ul>                                                                                                      | <ul style="list-style-type: none"><li></li></ul> |  |
| Maintenance and operating costs         | <ul style="list-style-type: none"><li>Low maintenance cost associated with cleaning out the trench</li><li>Lower maintenance frequency; likely once per year</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Maintenance frequency should be as directed by operations manual</li></ul>                                                                                                                                  | <ul style="list-style-type: none"><li></li></ul> |  |
| Impact on future development and growth | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                  |  |
| Summary / Recommendations               | <ul style="list-style-type: none"><li>A cooling trench is a cost effective alternative to meet temperature criteria</li></ul>                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li></li></ul> |  |
| Results of Alternative Evaluation       | <ul style="list-style-type: none"><li>Due to the other selected preferred options being below ground, the water is unaffected by the warming effects of the sun. Therefore, further temperature mitigation is not required at UC #94.</li></ul>                                                                                                                                                                                                                              | <ul style="list-style-type: none"><li></li></ul> |  |



| Table 1 –Evaluation of Conceptual Design Alternatives for Uncontrolled Outlet #103 (Uncontrolled Area) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Criteria                                                                                               | Alternatives for Uncontrolled Outlet #103                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                                                                                                        | Do Nothing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Oil-Grit Separators (OGS)                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Construct Water Quality Facility                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Alternative Description                                                                                | <ul style="list-style-type: none"><li>Stormwater runoff from the 46.64 ha minor drainage area will continue to be released into the receiving watercourse uncontrolled</li></ul>                                                                                                                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"><li>One (1) unit connected to the minor system prior to final control and outfall, as supplemental quality control</li></ul>                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"><li>Loss of current land use including clearing of vegetation</li><li>Significant earthworks operations</li><li>Remove and replace section of sewer and outlet infrastructure</li><li>Provision of wet habitat area adjacent to receiving watercourse</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Location in Treatment Train                                                                            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | End of Pipe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Target SWM Objective(s)                                                                                | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Quality Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Technical Considerations                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Constructability and accessibility                                                                     | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>Locations are accessible as OGS units could be installed upstream of the outfalls at manholes within municipal roadways; construction area is relatively small</li><li>Construction considerations include traffic interruptions and short term road closures</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Traffic management plans may reduce inconveniences associated with construction</li></ul> | <ul style="list-style-type: none"><li>The site is along public access trails</li><li>Redirection of servicing will be required to outlet to constructed wet pond</li><li>Existing changes in elevation could be incorporated as pond berms</li><li>There is limited space available for a staging area, therefore this may have to be placed within the construction area</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Existing trail may require temporary closure and /or re-routing</li></ul>                                                                                                                                                                                                                  |
| Ability to meet stormwater management objective(s)                                                     | <ul style="list-style-type: none"><li>Does not provide for or meet the stormwater management objectives of the City and/or TRCA for water quality, erosion or quantity control</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul>                                                                                                                                                                                                                    | <ul style="list-style-type: none"><li>OGS units may be able to provide partial treatment to reach stormwater quality objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Pre-treatment of stormwater runoff with LIDs will enhance the performance of the OGS</li></ul>                                                                                                                                                                | <ul style="list-style-type: none"><li>A wet pond facility would be capable of fully meeting the requirements for quality control</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>A wet pond facility for quality control could be constructed to include permanent pool capacity that will provide quality and erosion control within a single footprint reducing disturbance to nearby landowners</li><li>Quality control can be enhanced with LIDs that infiltrate runoff within the drainage area</li></ul>                                                                                                                                                                                                       |
| Engineering best practises / innovative solution                                                       | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>OGS and similar units are noted as best management practices</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Pre-treatment of stormwater runoff with LIDs will enhance the performance of the OGS</li><li>Filtration cartridge options may be used rather than traditional OGS to target more specific pollutants</li></ul>                                                                             | <ul style="list-style-type: none"><li>Typically more traditional SWM approach</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Quality control can be enhanced with LIDs that infiltrate runoff within the drainage area</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Summary / Recommendations                                                                              | <ul style="list-style-type: none"><li>Does not provide for or meet the stormwater management objectives of the City and/or TRCA for water quality, erosion or quantity control</li></ul>                                                                                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"><li>OGS can be effective, low-space option to provide water quality control</li></ul>                                                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>Technically feasible, requires re-grading of existing site</li><li>Construction of a surface detention facility can fully meet the quality control SWM criteria</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Natural Environment                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Impacts to wildlife and vegetation habitats                                                            | <ul style="list-style-type: none"><li>The current condition of wildlife and vegetation habitats will not change; however if the release of uncontrolled stormwater into the receiving watercourse causes future erosion in the watercourse or impacts the quality of the water in the watercourse, this could have a negative impact on the future condition of wildlife and vegetation habitats.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul> | <ul style="list-style-type: none"><li>OGS does not physically interfere with the existing outlet or impact the surrounding forested area and improves water quality prior to discharge to the watercourse</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation required</li></ul>                                                                                                                                                    | <ul style="list-style-type: none"><li>Existing vegetation will be cleared including an adult deciduous forest.</li><li>Results in a loss of terrestrial habitat</li><li>There are opportunities to improve the habitat quality of the receiving watercourse by reducing the sediment loading and potential contaminate exposure of the receiving watercourse</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Restoration plans will be developed to restore the surrounding areas impacted by construction</li><li>Riparian and aquatic vegetation can be planted on the berms and within the wet pond facility which will also aid in reducing the temperature impacts of the surface detention of runoff</li></ul> |
| Impacts / improvements based on SAR / ESA                                                              | <ul style="list-style-type: none"><li>Existing vegetation provides some benefit to reducing water temperature</li><li>By not implementing temperature controls, receiving waters may have higher temperatures over time and this can negatively impact sensitive species such as Redside Dace</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul>                                                                                                     | <ul style="list-style-type: none"><li>Meeting water quality criteria will improve water quality of downstream receiving waters</li><li>Little to no effect on temperature mitigation</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Use of OGS can be enhanced with pre-treatment using LIDs throughout minor system watershed</li></ul>                                                                                                     | <ul style="list-style-type: none"><li>There are opportunities to improve the habitat quality of the receiving watercourse by reducing the sediment loading of the watercourse</li><li>The receiving watercourse has been identified to be Redside Dace habitat</li><li>Wet ponds can provide reduction of stormwater temperature with the inclusion of a bottom draw outlet and shading from vegetation</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed</li></ul>                                                                                                                                                        |

| Criteria                                                                    | Alternatives for Uncontrolled Outlet #103                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                             | Do Nothing                                                                                                                                                                                                                                                                   | Oil-Grit Separators (OGS)                                                                                                                                                                                                                                                                                                                                                                                                                       | Construct Water Quality Facility                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|                                                                             |                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                 | design of the retrofit <ul style="list-style-type: none"><li>Stringent construction practices can be implemented to reduce the possibility of introducing invasive species to the ecosystem during construction</li></ul>                                                                                                                                                                                                                                                         |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>Existing vegetation and forest adjacent to uncontrolled outlet provides terrestrial habitat</li><li>Increasing erosion and water temperatures decrease water quality and affect the health of vegetation and aquatic species</li></ul> | <ul style="list-style-type: none"><li>OGS offers improvements to water quality</li><li>Used in conjunction with LIDs, OGS can improve water conditions for SAR</li></ul>                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"><li>A wet pond can be beneficial to downstream receiving waters but will alter any existing habitat within the construction area</li></ul>                                                                                                                                                                                                                                                                                                      |
| Social Impacts                                                              |                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Requirement of easements or purchase of private lands                       | N/A                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"><li>Likely not required; preference to install and maintain OGS within municipal R.O.W., where maintenance is easily accessible</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                                                                                                                                  | <ul style="list-style-type: none"><li>Likely not required for the construction and maintenance of a SWM facility for UC #103</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Land requirements would be confirmed through conceptual design</li></ul>                                                                                                                                                                         |
| Impacts to public and private properties due to construction and operations | N/A                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"><li>Roadway interference and/or short-term closure would be expected for the installation of OGS units</li><li>Temporary interference to be expected on roadways during maintenance (approximately once a year)</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Traffic management plans may reduce inconveniences associated with construction</li></ul> | <ul style="list-style-type: none"><li>Noise and visual impacts associated with construction for the residences backing onto proposed SWM facility block</li><li>A construction staging area may need to be set up within the pond block, therefore there will be no further impacts to the properties</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Construction management plan, including restrictions on hours</li></ul> |
| Effect on public safety                                                     | N/A                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"><li>Installed OGS does not pose threats to public safety</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul>                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>By building to the required side slope and depth criteria, the wet pond facility should not pose a threat to public safety</li><li>There are public trails along the construction site, which should be rerouted to a safer path</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Flattened slopes, warning signs, and fencing (if required) can provide measures of safety</li></ul>    |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>The ‘Do Nothing’ alternative has no social impacts</li></ul>                                                                                                                                                                           | <ul style="list-style-type: none"><li>OGS presents few and short-term impacts associated with installation and maintenance</li></ul>                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"><li>Construction of a wet pond facility would be a longer-term construction project with potential noise, traffic and visual impacts</li></ul>                                                                                                                                                                                                                                                                                                  |
| Economic Considerations                                                     |                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Capital costs                                                               | <ul style="list-style-type: none"><li>No action may result in greater capital expenses in the future</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                            | <ul style="list-style-type: none"><li>Relatively low capital cost for installation of one (1) unit and associated infrastructure works</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Capital cost of OGS units can be reduced if stormwater is pre-treated with LIDs (thus scaling down required OGS size)</li></ul>                                                                      | <ul style="list-style-type: none"><li>Moderate to high capital cost for earthworks, grading, infrastructure components and permits</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Capital costs can be marginally reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required quality control volumes and footprint)</li></ul>                                                       |
| Maintenance and operating costs                                             | N/A                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"><li>Fairly low maintenance cost and frequency; approximately annually</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Maintenance frequency of OGS units should not decrease with increased pre-treatment</li></ul>                                                                                                                                       | <ul style="list-style-type: none"><li>Moderate maintenance cost and frequency; likely seasonally</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Maintenance frequency should be as directed by operations manual</li><li>Maintenance frequency can be reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required quality control volume)</li></ul>                                  |
| Impact on future development and growth                                     | N/A                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"><li>Size of OGS is static once installed and would require upgrading if a larger drainage area is directed to it (in order to meet water quality criteria)</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Additional OGS units may be installed in the future to correspond with growth</li></ul>                                                        | <ul style="list-style-type: none"><li>No impact, but detention facility would require expansion if contributing land use was to intensify</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>On-site control requirements for any intensified development within the facility’s watershed would mitigate further expansion</li></ul>                                                                                             |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>‘Do nothing’ may postpone required works and increase future costs</li></ul>                                                                                                                                                           | <ul style="list-style-type: none"><li>Installation of OGS units is a low to medium cost solution for achievement of most of the required SWM criteria</li></ul>                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"><li>Construction of a wet pond facility would present moderate to high capital costs for achievement of quality control</li></ul>                                                                                                                                                                                                                                                                                                               |
| Results of Alternative Evaluation                                           | <ul style="list-style-type: none"><li>This alternative is not preferred because the alternative does not meet the stormwater management objectives</li></ul>                                                                                                                 | <ul style="list-style-type: none"><li>This is a preferred alternative due to the lower cost, small disturbance area and ability to provide full quality control</li><li>This alternative can be implemented with little to no loss of existing trees.</li></ul>                                                                                                                                                                                 | <ul style="list-style-type: none"><li>A wet pond facility would be capable of fully meeting the requirements for quality control</li><li>Retaining existing trees is a high priority for the City of Markham, however tree loss is probable for construction of this alternative. Therefore, this is not a preferred option.</li></ul>                                                                                                                                            |

| Criteria                                           | Alternatives for Uncontrolled Outlet #103                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                    | Bottom Draw Outlet in a Wet Pond                                                                                                                                                                                                                                                                                                               | Cooling Trench                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Underground Storage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Alternative Description                            | <ul style="list-style-type: none"><li>Construct a bottom draw outlet to reduce temperatures of discharged water.</li><li>Only applicable if the wetland is converted into a wet pond</li></ul>                                                                                                                                                 | <ul style="list-style-type: none"><li>Excavation of a trench between the pond control structure maintenance hole and the outlet</li><li>Modification of outlet piping infrastructure to discharge into trench</li><li>Installation of stone material and restoration of ground surface</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"><li>Installed at pond block location</li><li>Underground storage tanks will capture and detain stormwater and release over an extended time period</li><li>Infiltration type underground tanks will allow for infiltration during detention period</li><li>May need water quality control prior to infiltrating (if proposed)</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Location in Treatment Train                        | End of Pipe                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Target SWM Objectives                              | Temperature Control                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Quality, Erosion and Temperature Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Technical Considerations                           |                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Constructability and accessibility                 | <ul style="list-style-type: none"><li>Constructability is simple, pending adequate depth of the wet pond</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Greater depth enhances the thermal mitigation function of the bottom draw outlet</li></ul>                                        | <ul style="list-style-type: none"><li>Feasible construction and accessibility is adequate</li><li>Construction footprint is relatively small, but still requires additional space beyond the pond footprint</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Erosion and sediment control plans required</li></ul>                                                                                                                                                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"><li>Footprint may be large but is constructible within municipally owned pond block lands; constructability is low to moderate</li><li>Still allows for use of land at-grade</li><li>May require re-organization of existing outlets to feed into central underground tanks; not ideal due to neighbouring existing surface SWM facility</li><li>There is limited space available for a staging area, therefore this may have to be placed within the construction area</li><li>Based on soil mapping, the majority of the drainage area is not ideal for infiltration.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Tanks with infiltration capabilities provide additional benefits to erosion and temperature control</li><li>Constructability would likely be increased by incorporating several underground tanks rather than one central system</li><li>Site specific soil testing is required to confirm suitability of infiltration</li></ul> |
| Ability to meet stormwater management objective(s) | <ul style="list-style-type: none"><li>Bottom draw outlets can be effective in decreasing the temperature of the outlet water</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Thermal mitigation would be best achieved with a combination of LID methods</li></ul>                         | <ul style="list-style-type: none"><li>Cooling trenches can be effective in decreasing the temperature of the outlet water</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Thermal mitigation would be best achieved with a combination of LID methods</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>Underground tanks, especially with infiltration capabilities, are effective for providing quantity, quality and erosion control</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Longer detention times can enhance the erosion control</li><li>Underground storage tanks to be designed to provide quantity control</li><li>Infiltration type underground tanks will allow for infiltration during detention period</li><li>May need water quality control prior to infiltrating (if proposed)</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Engineering best practises / innovative solution   | <ul style="list-style-type: none"><li>Bottom draw outlets in combination with cooling trenches are recent best management practices</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Thermal mitigation can be enhanced overall with LIDs within the contributing watershed</li></ul>       | <ul style="list-style-type: none"><li>Cooling trenches are a recent best management practice</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Thermal mitigation can be enhanced overall with LIDs within the contributing watershed</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"><li>Underground tanks, including infiltration, are noted as best management practices</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Maintenance of underground tanks is more extensive than at-grade alternatives</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Summary / Recommendations                          | <ul style="list-style-type: none"><li>A bottom draw outlet is a recommended outlet alternative for the wet pond to achieve required temperature control</li></ul> <ul style="list-style-type: none"><li></li></ul>                                                                                                                             | <ul style="list-style-type: none"><li>Technically feasible with a small construction footprint</li><li>A cooling trench would help with mitigating the temperature impacts of the SWM pond</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"><li>Technically feasible, requiring more intrusive maintenance</li><li>Useful for maintaining land uses at-grade and visually not intrusive</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Natural Environment                                |                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Impacts to wildlife and vegetation habitats        | <ul style="list-style-type: none"><li>No impact to vegetation</li><li>May impact aquatic habitat; requires appropriate measures to avoid harm to fish</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Effects could be mitigated with appropriate screens and outflow velocities</li></ul> | <ul style="list-style-type: none"><li>Existing vegetation in the work area will be cleared</li><li>All effected areas will be restored and can be planted to replace removed vegetation</li><li>Results in a net neutral effect to terrestrial habitat</li><li>Reduction of temperature released into the downstream cool-water watercourse will improve the native aquatic habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Appropriate erosion and sediment control measures will be undertaken during construction to reduce any negative impacts to the downstream watercourse</li><li>Restoration plans will be developed to restore the surrounding areas impacted by construction</li></ul> | <ul style="list-style-type: none"><li>May require removal of some vegetation depending on specific location including the loss of existing adult trees</li><li>Once installed, less intrusive than other alternatives because of location below grade</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Restoration plan required if loss of vegetation expected due to construction</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Impacts / improvements                             | <ul style="list-style-type: none"><li>Cooling effects are very beneficial for Redside Dace habitat</li></ul>                                                                                                                                                                                                                                   | <ul style="list-style-type: none"><li>There are opportunities to improve the habitat quality of the receiving watercourse by</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"><li>Underground tanks may improve the habitat quality of the receiving watercourse by</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

| Criteria                                                                    | Alternatives for Uncontrolled Outlet #103                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                             | Bottom Draw Outlet in a Wet Pond                                                                                                                                                                                                                                                                      | Cooling Trench                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Underground Storage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| based on SAR / ESA                                                          | <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Alternative can be enhanced with LIDs within the watershed and planting techniques within the wet pond</li></ul>                                                                                            | reducing the temperature of flows entering the watercourse <ul style="list-style-type: none"><li>Cooling effects are very beneficial for Redside Dace habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Effects could be mitigated with appropriate screens and outflow velocities</li><li>Further consultation with the MNR regarding SAR will occur prior to the detailed design of the retrofit</li></ul>       | reducing the erosion and thereby sediment loading of the receiving watercourse <ul style="list-style-type: none"><li>The receiving watercourse has been identified to be Redside Dace habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Further consultation with the MNR regarding SAR will occur prior to the detailed design of the retrofit</li><li>Stringent construction practices can be implemented to reduce the possibility of introducing invasive species to the ecosystem during construction</li></ul> |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>Bottom draw outlet is a simple alternative to incorporate into a wet pond for the achievement of temperature control</li></ul>                                                                                                                                  | <ul style="list-style-type: none"><li>A cooling trench at the pond outlet is a relatively simple alternative to mitigate temperatures impacts of the wet pond for the achievement of temperature control</li></ul>                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>Underground tanks are a long-term non-invasive alternative for providing quantity, quality and erosion control</li><li>Disturbance to vegetation including the removal of trees</li></ul>                                                                                                                                                                                                                                                                                                                                                |
| Social Impacts                                                              |                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Requirement of easements or purchase of private lands                       | N/A                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"><li>Sufficient space is available within the pond block</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"><li>Not required for the construction and maintenance of an underground storage tank facility for UC #103</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Land requirements would be confirmed through conceptual design</li></ul>                                                                                                                                                                                                                                                       |
| Impacts to public and private properties due to construction and operations | <ul style="list-style-type: none"><li>Impacts are related to the construction of the wet pond</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Bottom draw outlet itself does not present additional impacts</li></ul>                             | <ul style="list-style-type: none"><li>Noise and visual impacts associated with construction for the residences backing onto proposed SWM facility block</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Construction management plan, including restrictions on hours may reduce inconveniences associated with construction</li></ul>                                                                                   | <ul style="list-style-type: none"><li>Noise and visual impacts associated with construction for the residences backing onto proposed SWM facility block</li><li>A construction staging area may need to be set up within the pond block, therefore there will be no further impact to properties</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Construction management plan, including restrictions on hours</li></ul>                                                                                                   |
| Effect on public safety                                                     | N/A                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"><li>The cooling trench will not have any affects on public safety once constructed</li><li>During construction there is a potential safety risk due to excavation if a member of the public was to enter the site</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>The construction site should be secured during and after construction hours with warning signs and fencing</li></ul> | <ul style="list-style-type: none"><li>No public safety concerns beyond construction period</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Proper signage and safety measures to be set up for construction period</li></ul>                                                                                                                                                                                                                                                                                               |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>There are no social impacts associated with the bottom draw outlet</li></ul>                                                                                                                                                                                    | <ul style="list-style-type: none"><li>There are no long term social impacts associated with the cooling trench</li><li>Minimal disturbance to the public may occur during construction but the construction time frame will be brief</li></ul>                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>Underground tanks are proposed to be located in the pond block; not intrusive to the public after construction</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Economic Considerations                                                     |                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Capital costs                                                               | <ul style="list-style-type: none"><li>Low capital cost as standalone item</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation required</li></ul>                                                                                        | <ul style="list-style-type: none"><li>Low to moderate capital cost for a relatively small excavation and materials</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Capital costs can be marginally reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required trench volume)</li></ul>                                                                                          | <ul style="list-style-type: none"><li>Moderate to high capital cost related to storage tank infrastructure</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Efficient tank design to minimize capital costs</li></ul>                                                                                                                                                                                                                                                                                                       |
| Maintenance and operating costs                                             | <ul style="list-style-type: none"><li>Low maintenance costs as standalone; costs associated with maintenance of wet pond</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Maintenance due to clogging can be reduced with proper screens</li></ul> | <ul style="list-style-type: none"><li>Low maintenance cost associated with cleaning out the trench</li><li>Lower maintenance frequency; likely once per year</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Maintenance frequency should be as directed by operations manual</li></ul>                                                                                                                                  | <ul style="list-style-type: none"><li>Low maintenance costs associated with cleaning out tanks as per operations manual or in event of clogging</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Can prevent clogging with additional pre-treatment techniques</li></ul>                                                                                                                                                                                                                                                    |
| Impact on future development and growth                                     | N/A                                                                                                                                                                                                                                                                                                   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"><li>No impact, but underground tanks would require expansion if contributing land use was to intensify</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>On-site control requirements for any future intensification within the watershed would mitigate further expansion</li></ul>                                                                                                                                                                                                       |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>Bottom draw outlet is a cost effective alternative to incorporate into wet pond design to meet temperature criteria</li></ul>                                                                                                                                   | <ul style="list-style-type: none"><li>A cooling trench is a cost effective alternative to meet temperature criteria; however a bottom draw outlet is relatively less costly</li></ul>                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"><li>Underground tanks provide moderate to high capital and maintenance costs for the achievement of quantity, quality and erosion control</li><li>A larger footprint may be required with the use of this alternative</li></ul>                                                                                                                                                                                                                                                                                                              |
| Results of Alternative                                                      | <ul style="list-style-type: none"><li>This alternative is not preferred because a wet pond is not a preferred option for this</li></ul>                                                                                                                                                               | <ul style="list-style-type: none"><li>Due to the other selected preferred options being below ground, the water is unaffected by</li></ul>                                                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"><li>This alternative is not preferred because constructing an underground storage tank is</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                          |



| Criteria   | Alternatives for Uncontrolled Outlet #103 |                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                       |
|------------|-------------------------------------------|-------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|            | Bottom Draw Outlet in a Wet Pond          | Cooling Trench                                                                                        | Underground Storage                                                                                                                                                                                                                                                                                                                                                                                                   |
| Evaluation | site.                                     | the warming effects of the sun. Therefore, further temperature mitigation is not required at UC #103. | <p>a more costly method to achieve quantity and erosion control when compared to constructing a pond.</p> <ul style="list-style-type: none"><li>▪ This alternative would not be able to provide enough storage volume to fully meet erosion or quantity control criteria due to limitations on the constructible depth of storage tank and the limited footprint of land available for underground storage.</li></ul> |

| Criteria                                           | Alternatives for Uncontrolled Outlet #103                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                    | Bioswales                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Infiltration in Right-of-Ways (R.O.W.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Aquatic and Riparian Plantings at Facility                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Alternative Description                            | <ul style="list-style-type: none"><li>Construct bioswales within the road right-of-ways within the facility drainage area</li><li>Bioswales to contain native plantings and subdrains</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"><li>Install perforated secondary pipe within existing storm sewer systems to allow for infiltration through linear soakaway pits</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"><li>Plantings to increase density and area of vegetation cover surrounding facility and within facility to provide shade for cooling of detained water</li><li>Is only applicable with construction of surface SWM facility</li></ul>                                                                                                                                                                                                                                       |
| Location in Treatment Train                        | Conveyance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | End of Pipe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Target SWM Objective(s)                            | Quality, Erosion and Temperature Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Temperature Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Technical Considerations                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Constructability and accessibility                 | <ul style="list-style-type: none"><li>Construction area is extensive and pipe networks are more intricate, requiring coordination with existing infrastructure</li><li>Road right of ways need to be conducive to grading and space criteria for bioswales</li><li>Based on soil mapping, the majority of the drainage area is not ideal for infiltration.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Bioswales may be more suited as supplementary water quality / erosion / temperature control measures, where constructability and retrofit are least disruptive to existing infrastructure</li><li>Site specific soil testing is required to confirm suitability of infiltration</li></ul> | <ul style="list-style-type: none"><li>Construction area is extensive and many secondary infiltration pipes would require to be installed to achieve SWM criteria</li><li>Requires coordination with existing infrastructure and utilities</li><li>Based on soil mapping, the majority of the drainage area is not ideal for infiltration.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may be more suited as supplementary water quality / erosion / temperature control measures, where constructability and retrofit are least disruptive to existing infrastructure</li><li>Site specific soil testing is required to confirm suitability of infiltration</li></ul> | <ul style="list-style-type: none"><li>No constructability issues anticipated with adding plantings to proposed facilities</li><li>Requires a surface SWM facility</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Plantings enhance temperature control by providing shade</li></ul>                                                                                                                                                                      |
| Ability to meet stormwater management objective(s) | <ul style="list-style-type: none"><li>Bioswales are more effective when used within a treatment train to achieve the stormwater objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Additional pre-treatment will enhance the function of bioswales, to reduce clogging of the underdrain pipes</li></ul>                                                                                                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may are more effective when used within a treatment train to achieve the stormwater objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Additional pre-treatment will enhance the function of the perforated pipes, to reduce clogging</li></ul>                                                                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"><li>Shade from plantings will reduce the temperature of stormwater at a facility</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Plantings are better used in conjunction with other cooling methods to achieve adequate temperature control</li></ul>                                                                                                                                                                  |
| Engineering best practises / innovative solution   | <ul style="list-style-type: none"><li>Bioswales are innovative solutions within stormwater management conveyance systems</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Enhanced with further use of LIDs such as vegetated filter strips</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may are innovative solutions within stormwater management</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Enhanced with further use of LIDs such as vegetated filter strips</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>Temperature control of stormwater in general is becoming an engineering best management practice in areas with sensitive habitats</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Effects of plantings can be enhanced with other methods such as use of a bottom draw outlet</li></ul>                                                                                                                             |
| Summary / Recommendations                          | <ul style="list-style-type: none"><li>Bioswales are effective as part of a treatment train and where retrofit does not greatly interfere with existing infrastructure</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may are effective as part of a treatment train and where retrofit does not greatly interfere with existing infrastructure</li><li>Due to the poor infiltration in the soil, Infiltration in the R.O.W. is not a preferred option.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"><li>Plantings at stormwater management facility are a simple alternative to provide additional temperature controls</li></ul>                                                                                                                                                                                                                                                                                                                                               |
| Natural Environment                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Impacts to wildlife and vegetation habitats        | <ul style="list-style-type: none"><li>May require removal of some vegetation depending on specific location</li><li>May present phosphorus issues if not properly designed and/or maintained</li><li>Bioswales may decrease water temperature, providing benefits to the aquatic habitat of the receiving watercourse</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Planted bioswales will enhance neighbourhoods with additional vegetated areas</li></ul>                                                                                                                                                                                                                                        | <ul style="list-style-type: none"><li>May require removal of some vegetation depending on specific location; likely few impacts to existing wildlife and vegetation habitats</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Areas disturbed during construction will be restored.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>Planting native species can enhance the existing wildlife and vegetation</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul>                                                                                                                                                                                                                                                         |
| Impacts / improvements based on SAR / ESA          | <ul style="list-style-type: none"><li>Bioswales may decrease water temperature, providing benefits to the aquatic habitat of the receiving watercourse including Redside Dace.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Bioswales may be more suited as supplementary water temperature control measures</li></ul>                                                                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"><li>Underground tanks may decrease water temperature, providing benefits to the aquatic habitat of the receiving watercourse including Redside Dace.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may be more suited as supplementary water temperature control measures</li></ul>                                                                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"><li>Providing additional shade at stormwater facilities reduces stormwater temperature which is a key benefit for Redside Dace Habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Effects of plantings can be enhanced with other methods such as use of a bottom draw outlet</li><li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li></ul> |
| Summary / Recommendations                          | <ul style="list-style-type: none"><li>Bioswales that are properly designed to avoid phosphorus loading provide positive impact on the natural environment</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits present few impact on the natural environment</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"><li>Plantings at stormwater facilities provide positive impacts on the natural environment (provided they are non-invasive species)</li></ul>                                                                                                                                                                                                                                                                                                                               |

| Criteria                                                                    | Alternatives for Uncontrolled Outlet #103                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                |
|-----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                             | Bioswales                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Infiltration in Right-of-Ways (R.O.W.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Aquatic and Riparian Plantings at Facility                                                                                                                                                                                                                                                     |
| Social Impacts                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                |
| Requirement of easements or purchase of private lands                       | <ul style="list-style-type: none"> <li>To be constructed within municipal R.O.W.</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not applicable</li> </ul>                                                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>To be constructed within municipal R.O.W.</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not applicable</li> </ul>                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>Not applicable (unless required in conjunction with stormwater facility construction)</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b><br>Not applicable                                                                                  |
| Impacts to public and private properties due to construction and operations | <ul style="list-style-type: none"> <li>Impacts may include temporary, minor traffic and noise issues and significant visual nuisances due to construction within the residential streets</li> <li>Bioswales are likely to face public opposition due to the maintenance requirements, visual disruption to an otherwise “clean” front lawn and inconvenience of culverts under driveways</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Appropriate construction and traffic management schedule to be adhered to</li> </ul> | <ul style="list-style-type: none"> <li>Impacts may include temporary, minor traffic and noise issues due to construction within the residential streets</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Appropriate construction and traffic management schedule to be adhered to</li> </ul>                                                                                                                                                                           | <ul style="list-style-type: none"> <li>N/A</li> </ul>                                                                                                                                                                                                                                          |
| Effect on public safety                                                     | <ul style="list-style-type: none"> <li>No public safety concerns beyond construction period</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Proper signage and safety measures to be set up for construction period</li> </ul>                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>No public safety concerns beyond construction period</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Proper signage and safety measures to be set up for construction period</li> </ul>                                                                                                                                                                                                                                         | <ul style="list-style-type: none"> <li>Vegetation should be suitable for proposed facility and clearly indicate any water’s edge</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Vegetation at facilities must be maintained</li> </ul>  |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"> <li>Impacts during construction are temporary and mostly minor</li> <li>Long term impacts on residents due to visual impacts and culvert maintenance are significant</li> </ul>                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"> <li>Impacts are minor and mostly temporary, within the construction period</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"> <li>No significant social impacts of plantings at stormwater facilities</li> </ul>                                                                                                                                                                          |
| Economic Considerations                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                |
| Capital costs                                                               | <ul style="list-style-type: none"> <li>Moderate to high capital cost related to new pipe infrastructure, earthworks and plantings, as well as likely relocation of existing pipe infrastructure</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Proficient SUE investigation prior to design work can minimize unexpected existing pipe/utility interferences</li> </ul>                                                                                                                                                      | <ul style="list-style-type: none"> <li>Moderate to high capital cost related to new pipe infrastructure, earthworks and plantings, as well as likely relocation of existing pipe infrastructure</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Proficient SUE investigation prior to design work can minimize unexpected existing pipe/utility interferences</li> </ul>                                                                                               | <ul style="list-style-type: none"> <li>Low capital cost relative to other alternatives</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Costs may vary depending on extents and types of plantings</li> </ul>                             |
| Maintenance and operating costs                                             | <ul style="list-style-type: none"> <li>Low to moderate maintenance costs associated with replacing filter media, unclogging perforated pipes</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Pre-treatment of stormwater with grassed filter strips can prevent some clogging of perforated pipes</li> </ul>                                                                                                                                                                                                                  | <ul style="list-style-type: none"> <li>Low to moderate maintenance costs associated with unclogging perforated pipes</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Pre-treatment of stormwater with grassed filter strips can prevent some clogging of perforated pipes</li> </ul>                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Low maintenance costs with native, sustainable plantings</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Lower maintenance plants will minimize costs of maintenance and/or replanting</li> </ul> |
| Impact on future development and growth                                     | <ul style="list-style-type: none"> <li>Retrofit R.O.W. with bioswales may dictate R.O.W. standards for future development</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>On-site control requirements for any future intensification within the watershed would mitigate negative impacts on the LID</li> </ul>                                                                                                                                                                                                              | <ul style="list-style-type: none"> <li>Retrofit R.O.W. with perforated pipes and soakaway pits may dictate R.O.W. standards for future development</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>On-site control requirements for any future intensification within the watershed would mitigate negative impacts on the LID</li> </ul>                                                                                                                              | <ul style="list-style-type: none"> <li>N/A</li> </ul>                                                                                                                                                                                                                                          |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"> <li>Bioswales are a moderate to high capital cost for retrofit but may add value to a neighbourhood</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Perforated pipes and soakaway pits are a moderate to high capital cost for retrofit</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>Plantings at SWM facilities are a low cost alternative for providing temperature control</li> </ul>                                                                                                                                                     |
| Results of Alternative Evaluation                                           | <ul style="list-style-type: none"> <li>This alternative is not preferred because bioswales cannot provide the required level of water quality and erosion control.</li> <li>Another alternative would need to be implemented in conjunction with bioswales in order to meet SWM objectives, making this alternative economically inefficient.</li> <li>The construction and maintenance of bioswales will create short and long term accessibility and visual impacts on residents.</li> </ul>                                                                                      | <ul style="list-style-type: none"> <li>This alternative is not preferred because infiltration in R.O.W.s cannot provide the required level of water quality and erosion control.</li> <li>Another alternative would need to be implemented in conjunction with infiltration in R.O.W.s in order to meet SWM objectives, making this alternative economically inefficient.</li> <li>The construction of infiltration pipes in R.O.W.s will create short term accessibility, visual and noise impacts on residents.</li> </ul> | <ul style="list-style-type: none"> <li>Due to the other selected preferred options being below ground, the water is unaffected by the warming effects of the sun. Therefore, further temperature mitigation is not required at UC #103.</li> </ul>                                             |

| Table 1 –Evaluation of Conceptual Design Alternatives for Uncontrolled Outlet #106 (Uncontrolled Area) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Criteria                                                                                               | Alternatives for Uncontrolled Outlet #106                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                                                                                                        | Do Nothing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Oil-Grit Separators (OGS)                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Construct Water Quality Facility                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Alternative Description                                                                                | <ul style="list-style-type: none"><li>Stormwater runoff from the 23.76 ha minor drainage area will continue to be released into the receiving watercourse uncontrolled</li></ul>                                                                                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"><li>One (1) unit connected to the minor system prior to final control and outfall</li></ul>                                                                                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"><li>Loss of current land use including clearing of vegetation</li><li>Significant earthworks operations</li><li>Remove and replace section of sewer and outlet infrastructure</li><li>Provision of wet habitat area adjacent to receiving watercourse</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Location in Treatment Train                                                                            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | End of Pipe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Target SWM Objective(s)                                                                                | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Quality Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Technical Considerations                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Constructability and accessibility                                                                     | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"><li>Locations are accessible as OGS units could be installed upstream of the outfalls at manholes within municipal roadways; construction area is relatively small</li><li>Construction considerations include traffic interruptions and short term road closures</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Traffic management plans may reduce inconveniences associated with construction</li></ul> | <ul style="list-style-type: none"><li>The site is accessible to the public through a trail.</li><li>Redirection of servicing will be required to outlet to constructed wet pond</li><li>Existing changes in elevation could be incorporated as pond berms; however available land are is not ideal for construction of a surface SWM facility (dense vegetation)</li><li>There is limited space for a staging area around the construction area; therefore it may be necessary to include this within the site or road R.O.W.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Access from 16<sup>th</sup> Avenue might be an easier option as a route for construction</li></ul>                                                                                                                                                    |
| Ability to meet stormwater management objective(s)                                                     | <ul style="list-style-type: none"><li>Does not provide for or meet the stormwater management objectives of the City and/or TRCA for water quality, erosion or quantity control</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul>                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>OGS units may be able to provide all required stormwater quality objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Pre-treatment of stormwater runoff with LIDs will enhance the performance of the OGS</li></ul>                                                                                                                                                                              | <ul style="list-style-type: none"><li>A wet pond facility would be capable of fully meeting the requirements for quality control</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>A wet pond facility for quantity control could be constructed to include extended detention capacity that will provide quality and erosion control within a single footprint</li><li>Quality control can be enhanced with LIDs that infiltrate runoff within the drainage area</li></ul>                                                                                                                                                                                                                                                                                                                                                           |
| Engineering best practises / innovative solution                                                       | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"><li>OGS and similar units are noted as best management practices</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Pre-treatment of stormwater runoff with LIDs will enhance the performance of the OGS</li><li>Filtration cartridge options may be used rather than traditional OGS to target more specific pollutants</li></ul>                                                                             | <ul style="list-style-type: none"><li>Typically more traditional SWM approach</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Quality control can be enhanced with LIDs that infiltrate runoff within the drainage area</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Summary / Recommendations                                                                              | <ul style="list-style-type: none"><li>Does not provide for or meet the stormwater management objectives of the City and/or TRCA for water quality, erosion or quantity control</li></ul>                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>OGS can be effective, low-space option to provide water quality control</li></ul>                                                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>Technically feasible, but surface SWM facility is not ideal for the land space available</li><li>Construction of a surface detention facility can fully meet the quality control SWM criteria</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Natural Environment                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Impacts to wildlife and vegetation habitats                                                            | <ul style="list-style-type: none"><li>Current condition of wildlife and vegetation habitats will not change; however if the release rate of uncontrolled stormwater into the receiving watercourse causes future erosion in the watercourse or impacts the quality of the water in the watercourse, this could have negative impact on the future condition of wildlife and vegetation habitats</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul> | <ul style="list-style-type: none"><li>OGS does not physically interfere with the existing outlet or impact the surrounding forested area and improves water quality prior to discharge to the watercourse</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation required</li></ul>                                                                                                                                                    | <ul style="list-style-type: none"><li>Existing vegetation will be cleared including a area of trees which is a native forest and includes two Butternut trees</li><li>Results in a loss of terrestrial habitat</li><li>There are opportunities to improve the habitat quality of the receiving watercourse by reducing the sediment loading and potential contaminate exposure of the receiving watercourse</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Restoration plans will be developed to restore the surrounding areas impacted by construction</li><li>Riparian and aquatic vegetation can be planted on the berms and within the wet pond facility which will also aid in reducing the temperature impacts of the surface detention of runoff</li><li>Permits required for work near SAR, including Butternut</li></ul> |
| Impacts / improvements based on SAR / ESA                                                              | <ul style="list-style-type: none"><li>The current condition of wildlife and vegetation habitats will not change; however if the release of uncontrolled stormwater into the receiving watercourse causes future erosion in the watercourse or impacts the quality of the water in the watercourse, this could have a negative impact on Redside Dace habitat.</li></ul> <b>Mitigation/Compensation/Enhancement</b>                                                                                                                     | <ul style="list-style-type: none"><li>Meeting water quality criteria will improve water quality of downstream receiving waters</li><li>Little to no effect on temperature mitigation</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Use of OGS can be enhanced with pre-treatment using LIDs throughout minor system watershed</li></ul>                                                                                                     | <ul style="list-style-type: none"><li>There are opportunities to improve the habitat quality of the receiving watercourse by reducing the sediment loading of the watercourse</li><li>Wet ponds can provide reduction of stormwater temperature with the inclusion of a bottom draw outlet and shading from vegetation</li></ul> <b>Mitigation/Compensation/Enhancement</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |



| Criteria                                                                           | Alternatives for Uncontrolled Outlet #106                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                    | Do Nothing                                                                                                                                                                                                                                                                   | Oil-Grit Separators (OGS)                                                                                                                                                                                                                                                                                                                                                                                                                       | Construct Water Quality Facility                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                                                                                    | <b>Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul>                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>Measures</b> <ul style="list-style-type: none"><li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li><li>Stringent construction practices can be implemented to reduce the possibility of introducing invasive species to the ecosystem during construction</li><li>The necessary procedures for construction within the Butternut habitat will be followed as outlined by the MNR.</li></ul>   |
| <b>Summary / Recommendations</b>                                                   | <ul style="list-style-type: none"><li>Existing vegetation and forest adjacent to uncontrolled outlet provides terrestrial habitat</li><li>Increasing erosion and water temperatures decrease water quality and affect the health of vegetation and aquatic species</li></ul> | <ul style="list-style-type: none"><li>OGS offers improvements to water quality</li><li>Used in conjunction with LIDs, OGS can improve water conditions for SAR</li></ul>                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"><li>A wet pond can be beneficial to downstream receiving waters but will alter any existing habitat within the construction area</li></ul>                                                                                                                                                                                                                                                                                            |
| Social Impacts                                                                     |                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Requirement of easements or purchase of private lands</b>                       | N/A                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"><li>Likely not required; preference to install and maintain OGS within municipal R.O.W., where maintenance is easily accessible</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                                                                                                                                  | <ul style="list-style-type: none"><li>Not required for the construction and maintenance of a SWM facility for UC #106</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Land requirements would be confirmed through conceptual design</li></ul>                                                                                                                                                                      |
| <b>Impacts to public and private properties due to construction and operations</b> | N/A                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"><li>Roadway interference and/or short-term closure would be expected for the installation of OGS units</li><li>Temporary interference to be expected on roadways during maintenance (approximately once a year)</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Traffic management plans may reduce inconveniences associated with construction</li></ul> | <ul style="list-style-type: none"><li>Noise and visual impacts associated with construction for the residences backing onto proposed SWM facility block</li><li>A construction staging area may need to be set up at the northwest corner of the site, which is municipally owned park land</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Construction management plan, including restrictions on hours</li></ul> |
| <b>Effect on public safety</b>                                                     | N/A                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"><li>Installed OGS does not pose threats to public safety</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul>                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>By building to the required side slope and depth criteria, the wet pond facility should not pose a threat to public safety</li><li>Trails through site would require temporary closure or re-routing</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Flattened slopes, warning signs, and fencing (if required) can provide measures of safety</li></ul>                      |
| <b>Summary / Recommendations</b>                                                   | <ul style="list-style-type: none"><li>The ‘Do Nothing’ alternative has no social impacts</li></ul>                                                                                                                                                                           | <ul style="list-style-type: none"><li>OGS presents few and short-term impacts associated with installation and maintenance</li></ul>                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"><li>Construction of a wet pond facility would be a longer-term construction project with potential noise, traffic and visual impacts</li></ul>                                                                                                                                                                                                                                                                                        |
| Economic Considerations                                                            |                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Capital costs</b>                                                               | <ul style="list-style-type: none"><li>No action may result in greater capital expenses in the future</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                            | <ul style="list-style-type: none"><li>Relatively low to moderate capital cost for installation of one (1) unit and associated infrastructure works</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Capital cost of OGS units can be reduced if stormwater is pre-treated with LIDs (thus scaling down required OGS size)</li></ul>                                                          | <ul style="list-style-type: none"><li>Moderate to high capital cost for earthworks, grading, infrastructure components and permits</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Capital costs can be marginally reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required quality control volumes and footprint)</li></ul>                                             |
| <b>Maintenance and operating costs</b>                                             | N/A                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"><li>Fairly low maintenance cost and frequency; approximately annually</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Maintenance frequency of OGS units should not decrease with increased pre-treatment</li></ul>                                                                                                                                       | <ul style="list-style-type: none"><li>Moderate maintenance cost and frequency; likely seasonally</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Maintenance frequency should be as directed by operations manual</li><li>Maintenance frequency can be reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required quality control volume)</li></ul>                        |
| <b>Impact on future development and growth</b>                                     | N/A                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"><li>Size of OGS is static once installed and would require upgrading if a larger drainage area is directed to it (in order to meet water quality criteria)</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Additional OGS units may be installed in the future to correspond with growth</li></ul>                                                        | <ul style="list-style-type: none"><li>No impact, but detention facility would require expansion if contributing land use was to intensify</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>On-site control requirements for any intensified development within the facility’s watershed would mitigate further expansion</li></ul>                                                                                   |
| <b>Summary / Recommendations</b>                                                   | <ul style="list-style-type: none"><li>‘Do nothing’ may postpone required works and increase future costs</li></ul>                                                                                                                                                           | <ul style="list-style-type: none"><li>Installation of OGS units is a low to medium cost solution for achievement of most of the required SWM criteria</li></ul>                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"><li>Construction of a wet pond facility would present moderate to high capital costs for achievement of quality control</li></ul>                                                                                                                                                                                                                                                                                                     |
| <b>Results of Alternative Evaluation</b>                                           | <ul style="list-style-type: none"><li>This alternative is not preferred because the alternative does not meet the stormwater management objectives</li></ul>                                                                                                                 | <ul style="list-style-type: none"><li>This is a preferred alternative due to the lower cost, small disturbance area and ability to provide full quality control</li><li>This alternative can be implemented with little to no loss of existing trees.</li></ul>                                                                                                                                                                                 | <ul style="list-style-type: none"><li>A wet pond facility would be capable of fully meeting the requirements for quality control</li><li>Retaining existing trees is a high priority for the City of Markham, however tree loss is probable for construction of this alternative. Therefore, this is not a preferred option.</li></ul>                                                                                                                                  |

| Criteria                                           | Alternatives for Uncontrolled Outlet #106                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                    | Bottom Draw Outlet in a Wet Pond                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Cooling Trench                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Underground Storage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Alternative Description                            | <ul style="list-style-type: none"><li>Construct a bottom draw outlet to reduce temperatures of discharged water.</li><li>Only applicable if the wetland is converted into a wet pond</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>Excavation of a trench between the pond control structure maintenance hole and the outlet</li><li>Modification of outlet piping infrastructure to discharge into trench</li><li>Installation of stone material and restoration of ground surface</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"><li>Installed at school location</li><li>Underground storage tanks will capture and detain stormwater and release over an extended time period</li><li>Infiltration type underground tanks will allow for infiltration during detention period</li><li>May need water quality control prior to infiltrating (if proposed)</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Location in Treatment Train                        | End of Pipe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Target SWM Objectives                              | Temperature Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Erosion and Temperature Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Technical Considerations                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Constructability and accessibility                 | <ul style="list-style-type: none"><li>Constructability is simple, pending adequate depth of the wet pond</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Greater depth enhances the thermal mitigation function of the bottom draw outlet</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"><li>Feasible construction and accessibility is adequate</li><li>Construction footprint is relatively small, but still requires additional space beyond the pond footprint</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Erosion and sediment control plans required</li></ul>                                                                                                                                                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"><li>Footprint may be large; constructability is low to moderate under ideal conditions</li><li>Grading at school location is not ideal</li><li>Still allows for use of land at-grade</li><li>May require re-organization of existing outlets to feed into central underground tanks</li><li>Based on soil mapping, the soil in the majority of the drainage area is conducive to infiltration. However, the southwest corner of the drainage area is not ideal for infiltration</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Tanks with infiltration capabilities provide additional benefits to erosion and temperature control</li><li>Constructability would likely be increased by incorporating several underground tanks rather than one central system</li><li>Site specific soil testing is required to confirm suitability of infiltration</li></ul> |
| Ability to meet stormwater management objective(s) | <ul style="list-style-type: none"><li>Bottom draw outlets can be effective in decreasing the temperature of the outlet water</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Thermal mitigation would be best achieved with a combination of LID methods</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"><li>Cooling trenches can be effective in decreasing the temperature of the outlet water</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Thermal mitigation would be best achieved with a combination of LID methods</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>Underground tanks, especially with infiltration capabilities, are effective for providing quantity, quality and erosion control</li><li>One tank at the school location would likely not be sufficient; additional tank near outlet would be required</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Longer detention times can enhance the erosion control</li><li>Infiltration type underground tanks will allow for infiltration during detention period</li><li>May need water quality control prior to infiltrating (if proposed)</li></ul>                                                                                                                                                                                                                                                                                                            |
| Engineering best practises / innovative solution   | <ul style="list-style-type: none"><li>Bottom draw outlets in combination with cooling trenches are recent best management practices</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Thermal mitigation can be enhanced overall with LIDs within the contributing watershed</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>Cooling trenches are a recent best management practice</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Thermal mitigation can be enhanced overall with LIDs within the contributing watershed</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"><li>Underground tanks, including infiltration, are noted as best management practices</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Maintenance of underground tanks is more extensive than at-grade alternatives</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Summary / Recommendations                          | <ul style="list-style-type: none"><li>A bottom draw outlet is a recommended outlet alternative for the wet pond to achieve required temperature control</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"><li>Technically feasible with a small construction footprint</li><li>A cooling trench would help with mitigating the temperature impacts of the SWM pond</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"><li>Technically feasible; multiple tanks likely required</li><li>Requires more intrusive maintenance</li><li>Useful for maintaining land uses at-grade and visually not intrusive</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Natural Environment                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Impacts to wildlife and vegetation habitats        | <ul style="list-style-type: none"><li>Existing vegetation in the work area will be cleared</li><li>All affected areas will be restored and can be planted to replace removed vegetation</li><li>Results in a net neutral effect to terrestrial habitat</li><li>Reduction of temperature released into the downstream cool-water watercourse will improve the native aquatic habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Appropriate erosion and sediment control measures will be undertaken during construction to reduce any negative impacts to the downstream watercourse</li><li>Restoration plans will be developed to restore the surrounding areas impacted by construction</li></ul> | <ul style="list-style-type: none"><li>Existing vegetation in the work area will be cleared</li><li>All effected areas will be restored and can be planted to replace removed vegetation</li><li>Results in a net neutral effect to terrestrial habitat</li><li>Reduction of temperature released into the downstream cool-water watercourse will improve the native aquatic habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Appropriate erosion and sediment control measures will be undertaken during construction to reduce any negative impacts to the downstream watercourse</li><li>Restoration plans will be developed to restore the surrounding areas impacted by construction</li></ul> | <ul style="list-style-type: none"><li>May require removal of some vegetation including existing adult trees depending on specific location</li><li>Once installed, less intrusive than other alternatives because of location below grade</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Restoration plan required if loss of vegetation expected due to construction</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Impacts /                                          | <ul style="list-style-type: none"><li>There are opportunities to improve the</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"><li>There are opportunities to improve the habitat</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>Underground tanks may improve the habitat</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

| Criteria                                                                    | Alternatives for Uncontrolled Outlet #106                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                             | Bottom Draw Outlet in a Wet Pond                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Cooling Trench                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Underground Storage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| improvements based on SAR / ESA                                             | habitat quality of the receiving watercourse by reducing the temperature of flows entering the watercourse <ul style="list-style-type: none"> <li>Cooling effects are very beneficial for Redside Dace habitat</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Effects on fish could be mitigated with appropriate screens and outflow velocities</li> <li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li> </ul>                  | quality of the receiving watercourse by reducing the temperature of flows entering the watercourse <ul style="list-style-type: none"> <li>Cooling effects are very beneficial for Redside Dace habitat</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Effects could be mitigated with appropriate screens and outflow velocities</li> <li>Further consultation with the MNR regarding SAR will occur prior to the detailed design of the retrofit</li> </ul> | quality of the receiving watercourse by reducing the erosion and thereby sediment loading of the receiving watercourse <ul style="list-style-type: none"> <li>The receiving watercourse has been identified as Redside Dace habitat</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li> <li>Stringent construction practices can be implemented to reduce the possibility of introducing invasive species to the ecosystem during construction</li> </ul> |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"> <li>A cooling trench at the pond outlet is a relatively simple alternative to mitigate temperatures impacts of the wet pond for the achievement of temperature control</li> </ul>                                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"> <li>A cooling trench at the pond outlet is a relatively simple alternative to mitigate temperatures impacts of the wet pond for the achievement of temperature control</li> </ul>                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>Underground tanks are a long-term non-invasive alternative for providing quantity, quality and erosion control</li> <li>Possible loss of adult trees</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Social Impacts                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Requirement of easements or purchase of private lands                       | <ul style="list-style-type: none"> <li>Sufficient space is available within the pond block</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not applicable</li> </ul>                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"> <li>Sufficient space is available within the pond block</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not applicable</li> </ul>                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"> <li>Cost sharing or other agreement likely required for the construction and maintenance of an underground storage tank facility for UC #106 at the school location</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Land requirements would be confirmed through conceptual design</li> </ul>                                                                                                                                                                                                                                              |
| Impacts to public and private properties due to construction and operations | <ul style="list-style-type: none"> <li>Noise and visual impacts associated with construction for the residences backing onto proposed SWM facility block</li> <li>A construction staging area may need to be set up within the existing Highway 7 easement to avoid impacts to residential properties during construction</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Construction management plan, including restrictions on hours may reduce inconveniences associated with construction</li> </ul> | <ul style="list-style-type: none"> <li>Noise and visual impacts associated with construction for the residences backing onto proposed SWM facility block</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Construction management plan, including restrictions on hours may reduce inconveniences associated with construction</li> </ul>                                                                                                                      | <ul style="list-style-type: none"> <li>Noise and visual impacts associated with construction for the residences backing onto proposed SWM facility block</li> <li>A construction staging area may need to be set up in the northwest corner of the site, which is municipally owned forested parkland</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Construction management plan, including restrictions on hours</li> </ul>                                                                                                                                                |
| Effect on public safety                                                     | <ul style="list-style-type: none"> <li>The bottom draw outlet will not impact public safety</li> <li>There are no trails through this green space and public access is very limited, thereby reducing the exposure of public to the facility</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>The construction site should be secured during and after construction hours with warning signs and fencing</li> </ul>                                                                                        | <ul style="list-style-type: none"> <li>The cooling trench will not have any affects on public safety once constructed</li> <li>During construction there is a potential safety risk due to excavation if a member of the public was to enter the site</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>The construction site should be secured during and after construction hours with warning signs and fencing</li> </ul>                                   | <ul style="list-style-type: none"> <li>No public safety concerns beyond construction period</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Proper signage and safety measures to be set up for construction period</li> </ul>                                                                                                                                                                                                                                                                                                                                                |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"> <li>There are no long term social impacts associated with the bottom draw outlet</li> <li>Minimal disturbance to the public may occur during construction but the construction time frame will be brief</li> </ul>                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"> <li>There are no long term social impacts associated with the cooling trench</li> <li>Minimal disturbance to the public may occur during construction but the construction time frame will be brief</li> </ul>                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Underground tanks are proposed to be located in the pond block; not intrusive to the public after construction</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Economic Considerations                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Capital costs                                                               | <ul style="list-style-type: none"> <li>Low capital cost for a relatively small excavation and materials</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Bottom draw outlet cost not likely to fluctuate much pending other design decisions on this site</li> </ul>                                                                                                                                                                                                                                       | <ul style="list-style-type: none"> <li>Low to moderate capital cost for a relatively small excavation and materials</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Capital costs can be marginally reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required trench volume)</li> </ul>                                                                                                                             | <ul style="list-style-type: none"> <li>Moderate to high capital cost related to storage tank infrastructure (especially if more than one tank is required)</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Efficient tank design to minimize capital costs</li> </ul>                                                                                                                                                                                                                                                                                                         |
| Maintenance and operating costs                                             | <ul style="list-style-type: none"> <li>Low maintenance cost associated with cleaning out the bottom draw outlet if clogged</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Maintenance frequency should be as directed by operations manual</li> </ul>                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>Low maintenance cost associated with cleaning out the trench</li> <li>Lower maintenance frequency; likely once per year</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Maintenance frequency should be as directed by operations manual</li> </ul>                                                                                                                                                                    | <ul style="list-style-type: none"> <li>Low maintenance costs associated with cleaning out tanks as per operations manual or in event of clogging</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Can prevent clogging with additional pre-treatment techniques</li> </ul>                                                                                                                                                                                                                                                                                                     |
| Impact on future development and growth                                     | <ul style="list-style-type: none"> <li>No impacts; may required upgrade or adjustment if contributing watershed characteristics change</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not applicable</li> </ul>                                                                                                                                                                                                                                                                                          | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"> <li>No impact, but underground tanks would require expansion if contributing land use was to intensify</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>On-site control requirements for any future intensification within the watershed would mitigate further expansion</li> </ul>                                                                                                                                                                                                                                                        |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"> <li>A bottom draw outlet is a cost effective alternative to meet temperature criteria</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>A cooling trench is a cost effective alternative to meet temperature criteria; however a bottom draw outlet is relatively less costly</li> </ul>                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>Underground tanks provide moderate to high capital and maintenance costs for the achievement of quantity, quality and erosion control</li> <li>A larger footprint may be required with the</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                        |

|                                          |                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                | use of this alternative                                                                                                                                                                                                                                                                                                                                                                                             |
|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Results of Alternative Evaluation</b> | <ul style="list-style-type: none"><li>▪ This alternative is not preferred because a wet pond is not a preferred option for this site</li></ul> | <ul style="list-style-type: none"><li>▪ Due to the other selected preferred options being below ground, the water is unaffected by the warming effects of the sun. Therefore, further temperature mitigation is not required at UC #106.</li><li>▪ The receiving watercourse is well vegetated to provide cooling effects in stream.</li></ul> | <ul style="list-style-type: none"><li>▪ This alternative is not preferred because constructing an underground storage tank is a more costly method to achieve quantity and erosion control when compared to constructing a pond.</li><li>▪ This alternative would have more constructability challenges and may require tree removal compared to other alternatives that achieve the same SWM objectives.</li></ul> |



| Criteria                                           | Alternatives for Uncontrolled Outlet #106                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                    | Bioswales                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Infiltration in Right-of-Ways (R.O.W.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Aquatic and Riparian Plantings at Facility                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Alternative Description                            | <ul style="list-style-type: none"><li>Construct bioswales within the road right-of-ways within the facility drainage area</li><li>Bioswales to contain native plantings and subdrains</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>Install perforated secondary pipe within existing storm sewer systems to allow for infiltration through linear soakaway pits</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>Plantings to increase density and area of vegetation cover surrounding facility and within facility to provide shade for cooling of detained water</li><li>Is only applicable with construction of surface SWM facility</li></ul>                                                                                                                                                                                                                                       |
| Location in Treatment Train                        | Conveyance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | End of Pipe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Target SWM Objective(s)                            | Erosion and Temperature Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Temperature Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Technical Considerations                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Constructability and accessibility                 | <ul style="list-style-type: none"><li>Construction area is extensive and pipe networks are more intricate, requiring coordination with existing infrastructure</li><li>Road right of ways need to be conducive to grading and space criteria for bioswales</li><li>Based on soil mapping, the soil in the majority of the drainage area is conducive to infiltration. However, the southwest corner of the drainage area is not ideal for infiltration</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Bioswales may be more suited as supplementary water quality / erosion / temperature control measures, where constructability and retrofit are least disruptive to existing infrastructure</li><li>Site specific soil testing is required to confirm suitability of infiltration</li></ul> | <ul style="list-style-type: none"><li>Construction area is extensive and many secondary infiltration pipes would require to be installed to achieve SWM criteria</li><li>Requires coordination with existing infrastructure and utilities</li><li>Based on soil mapping, the soil in the majority of the drainage area is conducive to infiltration. However, the southwest corner of the drainage area is not ideal for infiltration</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may be more suited as supplementary water quality / erosion / temperature control measures, where constructability and retrofit are least disruptive to existing infrastructure</li><li>Site specific soil testing is required to confirm suitability of infiltration</li></ul> | <ul style="list-style-type: none"><li>No constructability issues anticipated with adding plantings to proposed facilities</li><li>Requires a surface SWM facility</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Plantings enhance temperature control by providing shade</li></ul>                                                                                                                                                                      |
| Ability to meet stormwater management objective(s) | <ul style="list-style-type: none"><li>Bioswales are more effective when used within a treatment train to achieve the stormwater objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Additional pre-treatment will enhance the function of bioswales, to reduce clogging of the underdrain pipes</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may are more effective when used within a treatment train to achieve the stormwater objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Additional pre-treatment will enhance the function of the perforated pipes, to reduce clogging</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"><li>Shade from plantings will reduce the temperature of stormwater at a facility</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Plantings are better used in conjunction with other cooling methods to achieve adequate temperature control</li></ul>                                                                                                                                                                  |
| Engineering best practises / innovative solution   | <ul style="list-style-type: none"><li>Bioswales are innovative solutions within stormwater management conveyance systems</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Enhanced with further use of LIDs such as vegetated filter strips</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may are innovative solutions within stormwater management</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Enhanced with further use of LIDs such as vegetated filter strips</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>Temperature control of stormwater in general is becoming an engineering best management practice in areas with sensitive habitats</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Effects of plantings can be enhanced with other methods such as use of a bottom draw outlet</li></ul>                                                                                                                             |
| Summary / Recommendations                          | <ul style="list-style-type: none"><li>Bioswales are effective as part of a treatment train and where retrofit does not greatly interfere with existing infrastructure</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may are effective as part of a treatment train and where retrofit does not greatly interfere with existing infrastructure</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"><li>Plantings at stormwater management facility are a simple alternative to provide additional temperature controls</li></ul>                                                                                                                                                                                                                                                                                                                                               |
| Natural Environment                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Impacts to wildlife and vegetation habitats        | <ul style="list-style-type: none"><li>May require removal of some vegetation depending on specific location</li><li>May present phosphorus issues if not properly designed and/or maintained</li><li>Bioswales may decrease water temperature, providing benefits to the aquatic habitat of the receiving watercourse</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Planted bioswales will enhance neighbourhoods with additional vegetated areas</li></ul>                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"><li>May require removal of some vegetation depending on specific location; likely few impacts to existing wildlife and vegetation habitats</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Areas disturbed during construction will be restored.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>Planting native species can enhance the existing wildlife and vegetation</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul>                                                                                                                                                                                                                                                         |
| Impacts / improvements based on SAR / ESA          | <ul style="list-style-type: none"><li>Bioswales may decrease water temperature, providing benefits to the aquatic habitat of the receiving watercourse including Redside Dace.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Bioswales may be more suited as supplementary water temperature control measures</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"><li>Underground tanks may decrease water temperature, providing benefits to the aquatic habitat of the receiving watercourse including Redside Dace.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may be more suited as supplementary water temperature control measures</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>Providing additional shade at stormwater facilities reduces stormwater temperature which is a key benefit for Redside Dace Habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Effects of plantings can be enhanced with other methods such as use of a bottom draw outlet</li><li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li></ul> |
| Summary / Recommendations                          | <ul style="list-style-type: none"><li>Bioswales which are properly designed to avoid phosphorus loading provide positive impact on the natural environment</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits present few impact on the natural environment</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"><li>Plantings at stormwater facilities provide positive impacts on the natural environment (provided they are non-invasive species)</li></ul>                                                                                                                                                                                                                                                                                                                               |
| Social Impacts                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

| Criteria                                                                    | Alternatives for Uncontrolled Outlet #106                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                            |
|-----------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                             | Bioswales                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Infiltration in Right-of-Ways (R.O.W.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Aquatic and Riparian Plantings at Facility                                                                                                                                                                                                                                                 |
| Requirement of easements or purchase of private lands                       | <ul style="list-style-type: none"><li>To be constructed within municipal R.O.W.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                                                                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"><li>To be constructed within municipal R.O.W.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"><li>Not applicable (unless required in conjunction with stormwater facility construction)</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                   |
| Impacts to public and private properties due to construction and operations | <ul style="list-style-type: none"><li>Impacts may include temporary, minor traffic and noise issues and significant visual nuisances due to construction within the residential streets</li><li>Bioswales are likely to face public opposition due to the maintenance requirements, visual disruption to an otherwise “clean” front lawn and inconvenience of culverts under driveways</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Appropriate construction and traffic management schedule to be adhered to</li></ul> | <ul style="list-style-type: none"><li>Impacts may include temporary, minor traffic and noise issues due to construction within the residential streets</li><li>Less visual impact than bioswales</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Appropriate construction and traffic management schedule to be adhered to</li></ul>                                                                                                                                 | N/A                                                                                                                                                                                                                                                                                        |
| Effect on public safety                                                     | <ul style="list-style-type: none"><li>No public safety concerns beyond construction period</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Proper signage and safety measures to be set up for construction period</li></ul>                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>No public safety concerns beyond construction period</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Proper signage and safety measures to be set up for construction period</li></ul>                                                                                                                                                                                                                                         | <ul style="list-style-type: none"><li>Vegetation should be suitable for proposed facility and clearly indicate any water’s edge</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Vegetation at facilities must be maintained</li></ul>  |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>Impacts during construction are temporary and mostly minor</li><li>Long term impacts on residents due to visual impacts and culvert maintenance are significant</li></ul>                                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>Impacts are minor and mostly temporary, within the construction period</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"><li>No significant social impacts of plantings at stormwater facilities</li></ul>                                                                                                                                                                        |
| Economic Considerations                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                            |
| Capital costs                                                               | <ul style="list-style-type: none"><li>Moderate to high capital cost related to new pipe infrastructure, earthworks and plantings, as well as likely relocation of existing pipe infrastructure</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Proficient SUE investigation prior to design work can minimize unexpected existing pipe/utility interferences</li></ul>                                                                                                                                                     | <ul style="list-style-type: none"><li>Moderate to high capital cost related to new pipe infrastructure, earthworks and plantings, as well as likely relocation of existing pipe infrastructure</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Proficient SUE investigation prior to design work can minimize unexpected existing pipe/utility interferences</li></ul>                                                                                               | <ul style="list-style-type: none"><li>Low capital cost relative to other alternatives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Costs may vary depending on extents and types of plantings</li></ul>                             |
| Maintenance and operating costs                                             | <ul style="list-style-type: none"><li>Low to moderate maintenance costs associated with replacing filter media, unclogging perforated pipes</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Pre-treatment of stormwater with grassed filter strips can prevent some clogging of perforated pipes</li></ul>                                                                                                                                                                                                                 | <ul style="list-style-type: none"><li>Low to moderate maintenance costs associated with unclogging perforated pipes</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Pre-treatment of stormwater with grassed filter strips can prevent some clogging of perforated pipes</li></ul>                                                                                                                                                                                   | <ul style="list-style-type: none"><li>Low maintenance costs with native, sustainable plantings</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Lower maintenance plants will minimize costs of maintenance and/or replanting</li></ul> |
| Impact on future development and growth                                     | <ul style="list-style-type: none"><li>Retrofit R.O.W. with bioswales may dictate R.O.W. standards for future development</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>On-site control requirements for any future intensification within the watershed would mitigate negative impacts on the LID</li></ul>                                                                                                                                                                                                             | <ul style="list-style-type: none"><li>Retrofit R.O.W. with perforated pipes and soakaway pits may dictate R.O.W. standards for future development</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>On-site control requirements for any future intensification within the watershed would mitigate negative impacts on the LID</li></ul>                                                                                                                              | N/A                                                                                                                                                                                                                                                                                        |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>Bioswales are a moderate to high capital cost for retrofit but may add value to a neighbourhood</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>Perforated pipes and soakaway pits are a moderate to high capital cost for retrofit</li></ul>                                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>Plantings at SWM facilities are a low cost alternative for providing temperature control</li></ul>                                                                                                                                                   |
| Results of Alternative Evaluation                                           | <ul style="list-style-type: none"><li>This alternative is not preferred because bioswales cannot provide the required level of water quality and erosion control.</li><li>Another alternative would need to be implemented in conjunction with bioswales in order to meet SWM objectives, making this alternative economically inefficient.</li><li>The construction and maintenance of bioswales will create short and long term accessibility and visual impacts on residents.</li></ul>                                                                                     | <ul style="list-style-type: none"><li>This alternative is not preferred because infiltration in R.O.W.s cannot provide the required level of water quality and erosion control.</li><li>Another alternative would need to be implemented in conjunction with infiltration in R.O.W.s in order to meet SWM objectives, making this alternative economically inefficient.</li><li>The construction of infiltration pipes in R.O.W.s will create short term accessibility, visual and noise impacts on residents.</li></ul> | <ul style="list-style-type: none"><li>Due to the other selected preferred options being below ground, the water is unaffected by the warming effects of the sun. Therefore, further temperature mitigation is not required at UC #106.</li></ul>                                           |

| Table 1 –Evaluation of Conceptual Design Alternatives for Uncontrolled Outlet #112 (Uncontrolled Area) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Criteria                                                                                               | Alternatives for Uncontrolled Outlet #112                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                                                                                                        | Do Nothing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Oil-Grit Separators (OGS)                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Construct Water Quality Facility                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Alternative Description                                                                                | <ul style="list-style-type: none"><li>Stormwater runoff from the 1.69 ha minor drainage area will continue to be released into the receiving watercourse uncontrolled</li></ul>                                                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"><li>One (1) unit connected to the minor system prior to final control and outfall</li></ul>                                                                                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"><li>Loss of current land use including clearing of vegetation</li><li>Significant earthworks operations</li><li>Remove and replace section of sewer and outlet infrastructure</li><li>Provision of wet habitat area adjacent to receiving watercourse</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Location in Treatment Train                                                                            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | End of Pipe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Target SWM Objective(s)                                                                                | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Quality Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Technical Considerations                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Constructability and accessibility                                                                     | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"><li>Locations are accessible as OGS units could be installed upstream of the outfalls at manholes within municipal roadways; construction area is relatively small</li><li>Construction considerations include traffic interruptions and short term road closures</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Traffic management plans may reduce inconveniences associated with construction</li></ul> | <ul style="list-style-type: none"><li>The site is along public access trails</li><li>Redirection of servicing will be required to outlet to constructed wet pond</li><li>Existing changes in elevation could be incorporated as pond berms</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Existing trails may be realigned and enhanced to provide additional space for SWM facility</li></ul>                                                                                                                                                                                                                                                                                                                                      |
| Ability to meet stormwater management objective(s)                                                     | <ul style="list-style-type: none"><li>Does not provide for or meet the stormwater management objectives of the City and/or TRCA for water quality or erosion control</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul>                                                                                                                                                                                                                            | <ul style="list-style-type: none"><li>OGS units may be able to provide all required stormwater quality objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Pre-treatment of stormwater runoff with LIDs will enhance the performance of the OGS</li></ul>                                                                                                                                                                              | <ul style="list-style-type: none"><li>A wet pond facility would be capable of fully meeting the requirements for quality control</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>A wet pond facility for quantity control could be constructed to include erosion control within a single footprint</li><li>Quality control can be enhanced with LIDs that infiltrate runoff within the drainage area</li></ul>                                                                                                                                                                                                                                                                                                                      |
| Engineering best practises / innovative solution                                                       | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"><li>OGS and similar units are noted as best management practices</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Pre-treatment of stormwater runoff with LIDs will enhance the performance of the OGS</li><li>Filtration cartridge options may be used rather than traditional OGS to target more specific pollutants</li></ul>                                                                             | <ul style="list-style-type: none"><li>Typically more traditional SWM approach</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Quality control can be enhanced with LIDs that infiltrate runoff within the drainage area</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Summary / Recommendations                                                                              | <ul style="list-style-type: none"><li>Does not provide for or meet the stormwater management objectives of the City and/or TRCA for water quality or erosion control</li></ul>                                                                                                                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"><li>OGS can be effective, low-space option to provide water quality control</li></ul>                                                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>Technically feasible</li><li>Construction of a surface detention facility can fully meet the quality control SWM criteria</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Natural Environment                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Impacts to wildlife and vegetation habitats                                                            | <ul style="list-style-type: none"><li>Current condition of wildlife and vegetation habitats will not change; however if the release rate of uncontrolled stormwater into the receiving watercourse causes future erosion in the watercourse or impacts the quality of the water in the watercourse, this could have negative impact on the future condition of wildlife and vegetation habitats</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul> | <ul style="list-style-type: none"><li>OGS does not physically interfere with the existing outlet or impact the surrounding forested area and improves water quality prior to discharge to the watercourse</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation required</li></ul>                                                                                                                                                    | <ul style="list-style-type: none"><li>Existing vegetation will be cleared including the cultural meadow</li><li>Results in a loss of terrestrial habitat</li><li>There are opportunities to improve the habitat quality of the receiving watercourse by reducing the sediment loading and potential contaminate exposure of the receiving watercourse</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Restoration plans will be developed to restore the surrounding areas impacted by construction</li><li>Riparian and aquatic vegetation can be planted on the berms and within the wet pond facility which will also aid in reducing the temperature impacts of the surface detention of runoff</li></ul>                        |
| Impacts / improvements based on SAR / ESA                                                              | <ul style="list-style-type: none"><li>The current condition of wildlife and vegetation habitats will not change; however if the release of uncontrolled stormwater into the receiving watercourse causes future erosion in the watercourse or impacts the quality of the water in the watercourse, this could have a negative impact on Redside Dace habitat.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul>                                   | <ul style="list-style-type: none"><li>Meeting water quality criteria will improve water quality of downstream receiving waters</li><li>Little to no effect on temperature mitigation</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Use of OGS can be enhanced with pre-treatment using LIDs throughout minor system watershed</li></ul>                                                                                                     | <ul style="list-style-type: none"><li>There are opportunities to improve the habitat quality of the receiving watercourse by reducing the sediment loading of the watercourse</li><li>The receiving watercourse has been identified to be Redside Dace habitat</li><li>Wet ponds can provide reduction of stormwater temperature with the inclusion of a bottom draw outlet and shading from vegetation</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Further consultation with the MNR regarding SAR will occur prior to the detailed design of the retrofit</li><li>Stringent construction practices can be implemented to reduce the possibility of introducing invasive species to the ecosystem during construction</li></ul> |

| Criteria                                                                    | Alternatives for Uncontrolled Outlet #112                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                             | Do Nothing                                                                                                                                                                               | Oil-Grit Separators (OGS)                                                                                                                                                                                                                                                                                                                                                                                                                       | Construct Water Quality Facility                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>Existing vegetation and forest adjacent to the uncontrolled outlet provides terrestrial habitat and will remain in the current condition</li></ul> | <ul style="list-style-type: none"><li>OGS offers improvements to water quality</li><li>Used in conjunction with LIDs, OGS can improve water conditions for SAR</li></ul>                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"><li>A wet pond can be beneficial to downstream receiving waters but will alter any existing habitat within the construction area including mature trees in the cultural meadow</li></ul>                                                                                                                                                                                                                                                                         |
| Social Impacts                                                              |                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Requirement of easements or purchase of private lands                       | N/A                                                                                                                                                                                      | <ul style="list-style-type: none"><li>Not required; preference to install and maintain OGS within municipal R.O.W., where maintenance is easily accessible</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                                                                                                                                         | <ul style="list-style-type: none"><li>Likely not required for the construction and maintenance of a SWM facility for UC #112</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Land requirements would be confirmed through conceptual design</li></ul>                                                                                                                                                                                          |
| Impacts to public and private properties due to construction and operations | N/A                                                                                                                                                                                      | <ul style="list-style-type: none"><li>Roadway interference and/or short-term closure would be expected for the installation of OGS units</li><li>Temporary interference to be expected on roadways during maintenance (approximately once a year)</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Traffic management plans may reduce inconveniences associated with construction</li></ul> | <ul style="list-style-type: none"><li>Noise and visual impacts associated with construction for the residences backing onto proposed SWM facility block</li><li>A construction staging area may need to be set up to the east of the facility</li><li>The SWM facility would be built on public recreational park land</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Construction management plan, including restrictions on hours</li></ul> |
| Effect on public safety                                                     | N/A                                                                                                                                                                                      | <ul style="list-style-type: none"><li>Installed OGS does not pose threats to public safety</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul>                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>By building to the required side slope and depth criteria, the wet pond facility should not pose a threat to public safety</li><li>There are public trails along the construction site, which should be re-routed to a safer path</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Flattened slopes, warning signs, and fencing (if required) can provide measures of safety</li></ul>                    |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>The ‘Do Nothing’ alternative has no social impacts</li></ul>                                                                                       | <ul style="list-style-type: none"><li>OGS presents few and short-term impacts associated with installation and maintenance</li></ul>                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"><li>Construction of a wet pond facility would be a longer-term construction project with potential noise, traffic and visual impacts</li><li>Loss of public park space</li></ul>                                                                                                                                                                                                                                                                                 |
| Economic Considerations                                                     |                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Capital costs                                                               | N/A                                                                                                                                                                                      | <ul style="list-style-type: none"><li>Relatively low capital cost for installation of one (1) unit and associated infrastructure works</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Capital cost of OGS units can be reduced if stormwater is pre-treated with LIDs (thus scaling down required OGS size)</li></ul>                                                                      | <ul style="list-style-type: none"><li>Moderate to high capital cost for earthworks, grading, infrastructure components and permits</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Capital costs can be marginally reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required quality control volumes and footprint)</li></ul>                                                                        |
| Maintenance and operating costs                                             | N/A                                                                                                                                                                                      | <ul style="list-style-type: none"><li>Fairly low maintenance cost and frequency; approximately annually</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Maintenance frequency of OGS units should not decrease with increased pre-treatment</li></ul>                                                                                                                                       | <ul style="list-style-type: none"><li>Moderate maintenance cost and frequency; likely seasonally</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Maintenance frequency should be as directed by operations manual</li><li>Maintenance frequency can be reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required quality control volume)</li></ul>                                                   |
| Impact on future development and growth                                     | N/A                                                                                                                                                                                      | <ul style="list-style-type: none"><li>Size of OGS is static once installed and would require upgrading if a larger drainage area is directed to it (in order to meet water quality criteria)</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Additional OGS units may be installed in the future to correspond with growth</li></ul>                                                        | <ul style="list-style-type: none"><li>No impact, but detention facility would require expansion if contributing land use was to intensify</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>On-site control requirements for any intensified development within the facility’s watershed would mitigate further expansion</li></ul>                                                                                                              |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>‘Do nothing’ may postpone required works and increase future costs</li></ul>                                                                       | <ul style="list-style-type: none"><li>Installation of OGS units is a low cost solution for achievement of most of the required SWM criteria</li></ul>                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>Construction of a wet pond facility would present moderate to high capital costs for achievement of quality control</li></ul>                                                                                                                                                                                                                                                                                                                                |
| Results of Alternative Evaluation                                           | <ul style="list-style-type: none"><li>This alternative is not preferred because the alternative does not meet the stormwater management objectives</li></ul>                             | <ul style="list-style-type: none"><li>This is a preferred alternative due to the lower cost, small disturbance area and ability to provide full quality control</li><li>This alternative can be implemented with little to no loss of existing trees.</li></ul>                                                                                                                                                                                 | <ul style="list-style-type: none"><li>A wet pond facility would be capable of fully meeting the requirements for quality control</li><li>This is not a preferred option because of the loss of public park space and mature trees, as well as the temperature impacts that a wet pond would impose</li></ul>                                                                                                                                                                                       |



| Criteria                                           | Alternatives for Uncontrolled Outlet #112                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                    | Bottom Draw Outlet in a Wet Pond                                                                                                                                                                                                                                                                                                             | Construct Extended Detention Facility                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Underground Storage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Alternative Description                            | <ul style="list-style-type: none"> <li>Construct a bottom draw outlet to reduce temperatures of discharged water.</li> <li>Only applicable if the area is converted into a wet pond</li> </ul>                                                                                                                                               | <ul style="list-style-type: none"> <li>Loss of current land use including clearing of vegetation</li> <li>Significant earthworks</li> <li>Remove and replace section of existing sewer and outlet infrastructure</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>Installed at pond block location</li> <li>Underground storage tanks will capture and detain stormwater and release over an extended time period</li> <li>Infiltration type underground tanks will allow for infiltration during detention period</li> <li>May need water quality control prior to infiltrating (if proposed)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                              |
| Location in Treatment Train                        | End of Pipe                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Target SWM Objectives                              | Temperature Control                                                                                                                                                                                                                                                                                                                          | Erosion Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Erosion and Temperature Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Technical Considerations                           |                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Constructability and accessibility                 | <ul style="list-style-type: none"> <li>Constructability is simple, pending adequate depth of the wet pond</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Greater depth enhances the thermal mitigation function of the bottom draw outlet</li> </ul>                                  | <ul style="list-style-type: none"> <li>The site is along a public access trail</li> <li>Redirection of servicing will be required to outlet to constructed extended detention facility</li> <li>Existing changes in elevation could be incorporated as pond berms</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Existing trails may be realigned and enhanced to provide additional space for SWM facility</li> </ul>                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"> <li>Footprint may be large but is constructible within municipally owned pond block lands; constructability is moderate</li> <li>Still allows for use of land at-grade</li> <li>May require re-organization of existing outlets to feed into central underground tanks</li> <li>Based on soil mapping, the majority of the drainage area is not ideal for infiltration. However, the pond block is conducive to infiltration</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Tanks with infiltration capabilities provide additional benefits to erosion and temperature control</li> <li>Site specific soil testing is required to confirm suitability of infiltration</li> </ul> |
| Ability to meet stormwater management objective(s) | <ul style="list-style-type: none"> <li>Bottom draw outlets can be effective in decreasing the temperature of the outlet water</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Thermal mitigation would be best achieved with a combination of LID methods</li> </ul>                   | <ul style="list-style-type: none"> <li>An extended detention facility would be capable of fully meeting the requirements for erosion control detention</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>An extended detention facility for erosion control could be incorporated with a wet pond and sized to provide quality control within a single pond block reducing construction footprints and disturbance to nearby landowners</li> <li>Erosion control can be enhanced with LIDs that detain and/or infiltrate runoff within the drainage area</li> <li>Extended detention facilities could be enhanced with outlets which consider thermal mitigation techniques, to improve water quality of the diverted flows</li> </ul> | <ul style="list-style-type: none"> <li>Underground tanks, especially with infiltration capabilities, are effective for providing quality and erosion control</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Longer detention times can enhance the erosion control</li> <li>Infiltration type underground tanks will allow for infiltration during detention period</li> <li>May need water quality control prior to infiltrating (if proposed)</li> </ul>                                                                                                                                                                                                                                                           |
| Engineering best practises / innovative solution   | <ul style="list-style-type: none"> <li>Bottom draw outlets in combination with cooling trenches are recent best management practices</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Thermal mitigation can be enhanced overall with LIDs within the contributing watershed</li> </ul> | <ul style="list-style-type: none"> <li>Typically more traditional SWM approach</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Erosion control can be enhanced with LIDs that detain and/or infiltrate runoff within the drainage area</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>Underground tanks, including infiltration, are noted as best management practices</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Maintenance of underground tanks is more extensive than at-grade alternatives</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Summary / Recommendations                          | <ul style="list-style-type: none"> <li>A bottom draw outlet is a recommended outlet alternative for the wet pond to achieve required temperature control</li> </ul>                                                                                                                                                                          | <ul style="list-style-type: none"> <li>Technically feasible</li> <li>Construction of a extended detention facility can fully meet the erosion control SWM criteria</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"> <li>Technically feasible, requiring more intrusive maintenance</li> <li>Useful for maintaining land uses at-grade and visually not intrusive</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Natural Environment                                |                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Impacts to wildlife and vegetation habitats        | <ul style="list-style-type: none"> <li>No impact to vegetation</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Effects could be mitigated with appropriate screens and outflow velocities to avoid harm to any species which may be found in the wet pond</li> </ul>                   | <ul style="list-style-type: none"> <li>Existing vegetation will be cleared including the cultural meadow</li> <li>Results in a loss of terrestrial habitat</li> <li>There are opportunities to improve the habitat quality of the receiving watercourse by reducing the peak flows entering the watercourse and thereby reducing erosion</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Restoration plans will be developed to restore the surrounding areas impacted by construction</li> <li>Vegetation can be planted on the berms of the extended detention facility which will also aid in reducing the temperature impacts of the surface detention of runoff</li> </ul>                                                      | <ul style="list-style-type: none"> <li>May require removal of some vegetation depending on specific location</li> <li>Once installed, less intrusive than other alternatives because of location below grade</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Restoration plan required if loss of vegetation expected due to construction</li> </ul>                                                                                                                                                                                                                                                                                                                                                                  |
| Impacts / improvements based on SAR / ESA          | <ul style="list-style-type: none"> <li>Cooling effects are very beneficial for Redside Dace habitat</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Alternative can be enhanced with LIDs within</li> </ul>                                                                            | <ul style="list-style-type: none"> <li>There are opportunities to improve the habitat quality of the receiving watercourse by reducing the erosion and thereby sediment loading of the receiving watercourse</li> <li>The receiving watercourse has been identified</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>Underground tanks may improve the habitat quality of the receiving watercourse by reducing the erosion and thereby sediment loading of the receiving watercourse</li> <li>The receiving watercourse has been</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

| Criteria                                                                           | Alternatives for Uncontrolled Outlet #112                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                    | Bottom Draw Outlet in a Wet Pond                                                                                                                                                                                                                                                                      | Construct Extended Detention Facility                                                                                                                                                                                                                                                                                                                                                                                                                                               | Underground Storage                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|                                                                                    | the watershed and planting techniques within the wet pond                                                                                                                                                                                                                                             | to be Redside Dace habitat<br><b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Thermal mitigation methods required to improve Redside Dace habitat</li><li>Further consultation with the MNR regarding SAR will occur prior to the detailed design of the retrofit</li><li>Stringent construction practices can be implemented to reduce the possibility of introducing invasive species to the ecosystem during construction</li></ul>    | identified to be Redside Dace habitat<br><b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Further consultation with the MNR regarding SAR will occur prior to the detailed design of the retrofit</li><li>Stringent construction practices can be implemented to reduce the possibility of introducing invasive species to the ecosystem during construction</li></ul>                                                                      |
| <b>Summary / Recommendations</b>                                                   | <ul style="list-style-type: none"><li>Bottom draw outlet is a simple alternative to incorporate into a wet pond for the achievement of temperature control</li></ul>                                                                                                                                  | <ul style="list-style-type: none"><li>An extended detention facility can be beneficial to downstream receiving waters but will alter any existing habitat within the construction area including adult trees</li></ul>                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"><li>Underground tanks are a long-term non-invasive alternative for providing quantity, quality and erosion control</li><li>May require removal of adult trees</li></ul>                                                                                                                                                                                                                                                                            |
| Social Impacts                                                                     |                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Requirement of easements or purchase of private lands</b>                       | N/A                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"><li>Likely not required for the construction and maintenance of a SWM facility for UC #112</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Land requirements would be confirmed through conceptual design</li></ul>                                                                                                                                                                           | <ul style="list-style-type: none"><li>Not required for the construction and maintenance of an underground storage tank facility for UC #112</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Land requirements would be confirmed through conceptual design</li></ul>                                                                                                                                                             |
| <b>Impacts to public and private properties due to construction and operations</b> | <ul style="list-style-type: none"><li>Impacts are related to the construction of the wet pond</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Bottom draw outlet itself does not present additional impacts</li></ul>                             | <ul style="list-style-type: none"><li>Noise and visual impacts associated with construction for the residences backing onto proposed SWM facility block</li><li>A construction staging area may need to be set up to the east of the facility</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Construction management plan, including restrictions on hours</li></ul>                                                           | <ul style="list-style-type: none"><li>Noise and visual impacts associated with construction for the residences backing onto proposed SWM facility block</li><li>Temporary closures of public trails</li><li>A construction staging area may need to be set up to the east of the facility</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Construction management plan, including restrictions on hours</li></ul>                |
| <b>Effect on public safety</b>                                                     | N/A                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"><li>By building to the required slope and depth criteria, the extended detention facility should not pose a threat to public safety</li><li>There are public trails along the construction site, which should be re-routed to a safer path</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Adequate slopes, warning signs, and fencing (if required) can provide measures of safety</li></ul> | <ul style="list-style-type: none"><li>No public safety concerns beyond construction period</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Proper signage and safety measures to be set up for construction period</li></ul>                                                                                                                                                                                                     |
| <b>Summary / Recommendations</b>                                                   | <ul style="list-style-type: none"><li>There are no social impacts associated with the bottom draw outlet</li></ul>                                                                                                                                                                                    | <ul style="list-style-type: none"><li>Construction of an extended detention facility would be a longer-term construction project with potential noise, traffic and visual impacts</li></ul>                                                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"><li>Underground tanks are proposed to be located in the pond block; not intrusive to the public after construction</li></ul>                                                                                                                                                                                                                                                                                                                       |
| Economic Considerations                                                            |                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Capital costs</b>                                                               | <ul style="list-style-type: none"><li>Low capital cost as standalone item</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation required</li></ul>                                                                                        | <ul style="list-style-type: none"><li>Moderate to high capital cost for earthworks, grading, infrastructure components, permits</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Capital costs can be marginally reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required detention volumes)</li></ul>                                                                                | <ul style="list-style-type: none"><li>Moderate to high capital cost related to storage tank infrastructure</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Efficient tank design to minimize capital costs</li></ul>                                                                                                                                                                                                             |
| <b>Maintenance and operating costs</b>                                             | <ul style="list-style-type: none"><li>Low maintenance costs as standalone; costs associated with maintenance of wet pond</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Maintenance due to clogging can be reduced with proper screens</li></ul> | <ul style="list-style-type: none"><li>Lower maintenance cost and frequency; likely every few years</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Maintenance frequency should be as directed by operations manual</li><li>Maintenance frequency can be reduced by providing pre-treatment for sediment removal</li></ul>                                                                                                      | <ul style="list-style-type: none"><li>Low maintenance costs associated with cleaning out tanks as per operations manual or in event of clogging</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Can prevent clogging with additional pre-treatment techniques</li></ul>                                                                                                                                                          |
| <b>Impact on future development and growth</b>                                     | N/A                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"><li>No impact, but extended detention facility would require expansion if contributing land use was to intensify</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>On-site control requirements for any intensified development within the facility's watershed would mitigate further expansion</li></ul>                                                                                      | <ul style="list-style-type: none"><li>No impact, but underground tanks would require expansion if contributing land use was to intensify</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>On-site control requirements for any future intensification within the watershed would mitigate further expansion</li><li>If smaller tanks are to be located on privately owned lands, cost sharing agreements may be created</li></ul> |
| <b>Summary / Recommendations</b>                                                   | <ul style="list-style-type: none"><li>Bottom draw outlet is a cost effective alternative to incorporate into wet pond design to meet temperature criteria</li></ul>                                                                                                                                   | <ul style="list-style-type: none"><li>Construction of an extended detention facility would present moderate to high capital costs for achievement of erosion control</li></ul>                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>Underground tanks provide moderate to high capital and maintenance costs for the achievement of quantity, quality and erosion control</li><li>A larger footprint may be required with the use of this alternative</li></ul>                                                                                                                                                                                                                    |
| <b>Results of Alternative Evaluation</b>                                           | <ul style="list-style-type: none"><li>This alternative is not preferred because a wet pond is not a preferred option for this site</li></ul>                                                                                                                                                          | <ul style="list-style-type: none"><li>This is not a preferred option because there is not enough space to build an adequately sized facility for the required erosion control without the removal of adult trees</li></ul>                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"><li>This alternative is not preferred because constructing an underground storage tank is a more costly method to achieve quantity and erosion control when compared to</li></ul>                                                                                                                                                                                                                                                                  |

| Criteria | Alternatives for Uncontrolled Outlet #112 |                                       |                                                                                                                                                                                                                                     |
|----------|-------------------------------------------|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|          | Bottom Draw Outlet in a Wet Pond          | Construct Extended Detention Facility | Underground Storage                                                                                                                                                                                                                 |
|          |                                           |                                       | constructing a pond. <ul style="list-style-type: none"><li>This alternative would have more constructability challenges and may require tree removal compared to other alternatives that achieve the same SWM objectives.</li></ul> |

| Criteria                                           | Alternatives for Uncontrolled Outlet #112                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
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|                                                    | Bioswales                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Infiltration in Right-of-Ways (R.O.W.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Aquatic and Riparian Plantings at Facility                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Alternative Description                            | <ul style="list-style-type: none"><li>Construct bioswales within the road right-of-ways within the facility drainage area</li><li>Bioswales to contain native plantings and subdrains</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>Install perforated secondary pipe within existing storm sewer systems to allow for infiltration through linear soakaway pits</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>Plantings to increase density and area of vegetation cover surrounding facility and within facility to provide shade for cooling of detained water</li></ul>                                                                                                                                                                                                                                                                                                 |
| Location in Treatment Train                        | Conveyance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | End of Pipe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Target SWM Objective(s)                            | Quality, Erosion and Temperature Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Temperature Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Technical Considerations                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Constructability and accessibility                 | <ul style="list-style-type: none"><li>Construction area is extensive and pipe networks are more intricate, requiring coordination with existing infrastructure</li><li>Road right of ways need to be conducive to grading and space criteria for bioswales</li><li>Based on soil mapping, the majority of the drainage area is not ideal for infiltration. However, the pond block is conducive to infiltration</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Bioswales may be more suited as supplementary water quality / erosion / temperature control measures, where constructability and retrofit are least disruptive to existing infrastructure</li><li>Site specific soil testing is required to confirm suitability of infiltration</li></ul> | <ul style="list-style-type: none"><li>Construction area is extensive and many secondary infiltration pipes would require to be installed to achieve SWM criteria</li><li>Requires coordination with existing infrastructure and utilities</li><li>Based on soil mapping, the majority of the drainage area is not ideal for infiltration. However, the pond block is conducive to infiltration</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may be more suited as supplementary water quality / erosion / temperature control measures, where constructability and retrofit are least disruptive to existing infrastructure</li><li>Site specific soil testing is required to confirm suitability of infiltration</li></ul> | <ul style="list-style-type: none"><li>No constructability issues anticipated with adding plantings to proposed facilities</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Plantings enhance temperature control by providing shade</li></ul>                                                                                                                                                                                                   |
| Ability to meet stormwater management objective(s) | <ul style="list-style-type: none"><li>Bioswales are more effective when used within a treatment train to achieve the stormwater objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Additional pre-treatment will enhance the function of bioswales, to reduce clogging of the underdrain pipes</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may are more effective when used within a treatment train to achieve the stormwater objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Additional pre-treatment will enhance the function of the perforated pipes, to reduce clogging</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>Shade from plantings will reduce the temperature of stormwater at a facility</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Plantings are better used in conjunction with other cooling methods to achieve adequate temperature control</li></ul>                                                                                                                                                       |
| Engineering best practises / innovative solution   | <ul style="list-style-type: none"><li>Bioswales are innovative solutions within stormwater management conveyance systems</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Enhanced with further use of LIDs such as vegetated filter strips</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may are innovative solutions within stormwater management</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Enhanced with further use of LIDs such as vegetated filter strips</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"><li>Temperature control of stormwater in general is becoming an engineering best management practice in areas with sensitive habitats</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Effects of plantings can be enhanced with other methods such as use of a bottom draw outlet</li></ul>                                                                                                                  |
| Summary / Recommendations                          | <ul style="list-style-type: none"><li>Bioswales are effective as part of a treatment train and where retrofit does not greatly interfere with existing infrastructure</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may are effective as part of a treatment train and where retrofit does not greatly interfere with existing infrastructure</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"><li>Plantings at stormwater management facility are a simple alternative to provide additional temperature controls</li></ul>                                                                                                                                                                                                                                                                                                                                    |
| Natural Environment                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Impacts to wildlife and vegetation habitats        | <ul style="list-style-type: none"><li>May require removal of some vegetation depending on specific location</li><li>May present phosphorus issues if not properly designed and/or maintained</li><li>Bioswales may decrease water temperature, providing benefits to the aquatic habitat of the receiving watercourse</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Planted bioswales will enhance neighbourhoods with additional vegetated areas</li></ul>                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"><li>May require removal of some vegetation depending on specific location; likely few impacts to existing wildlife and vegetation habitats</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Areas disturbed during construction will be restored.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>Planting native species can enhance the existing wildlife and vegetation</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul>                                                                                                                                                                                                                                              |
| Impacts / improvements based on SAR / ESA          | <ul style="list-style-type: none"><li>Bioswales may decrease water temperature, providing benefits to the aquatic habitat of the receiving watercourse including Redside Dace.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Bioswales may be more suited as supplementary water temperature control measures</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"><li>Underground tanks may decrease water temperature, providing benefits to the aquatic habitat of the receiving watercourse including Redside Dace.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may be more suited as supplementary water temperature control measures</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"><li>Providing additional shade at stormwater facilities reduces stormwater temperature which is a key benefit for Redside Dace Habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Effects of plantings can be enhanced with other methods such as use of a bottom draw outlet</li><li>Further consultation with the MNR regarding SAR will occur prior to the detailed design of the retrofit</li></ul> |
| Summary / Recommendations                          | <ul style="list-style-type: none"><li>Bioswales that are properly designed to avoid phosphorus loading provide positive impact on the natural environment</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits present few impact on the natural environment</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>Plantings at stormwater facilities provide positive impacts on the natural environment (provided they are non-invasive species)</li></ul>                                                                                                                                                                                                                                                                                                                    |
| Social Impacts                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Requirement of                                     | <ul style="list-style-type: none"><li>To be constructed within municipal R.O.W.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"><li>To be constructed within municipal R.O.W.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>Not applicable (unless required in conjunction with stormwater facility</li></ul>                                                                                                                                                                                                                                                                                                                                                                            |



| Criteria                                                                    | Alternatives for Uncontrolled Outlet #112                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                |
|-----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                             | Bioswales                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Infiltration in Right-of-Ways (R.O.W.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Aquatic and Riparian Plantings at Facility                                                                                                                                                                                                                                                     |
| easements or purchase of private lands                                      | <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not applicable</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not applicable</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                         | construction)<br><b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not applicable</li> </ul>                                                                                                                                                          |
| Impacts to public and private properties due to construction and operations | <ul style="list-style-type: none"> <li>Impacts may include temporary, minor traffic and noise issues and significant visual nuisances due to construction within the residential streets</li> <li>Bioswales are likely to face public opposition due to the maintenance requirements, visual disruption to an otherwise “clean” front lawn and inconvenience of culverts under driveways</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Appropriate construction and traffic management schedule to be adhered to</li> </ul> | <ul style="list-style-type: none"> <li>Impacts may include temporary, minor traffic and noise issues due to construction within the residential streets</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Appropriate construction and traffic management schedule to be adhered to</li> </ul>                                                                                                                                                                           | N/A                                                                                                                                                                                                                                                                                            |
| Effect on public safety                                                     | <ul style="list-style-type: none"> <li>No public safety concerns beyond construction period</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Proper signage and safety measures to be set up for construction period</li> </ul>                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>No public safety concerns beyond construction period</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Proper signage and safety measures to be set up for construction period</li> </ul>                                                                                                                                                                                                                                         | <ul style="list-style-type: none"> <li>Vegetation should be suitable for proposed facility and clearly indicate any water’s edge</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Vegetation at facilities must be maintained</li> </ul>  |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"> <li>Impacts during construction are temporary and mostly minor</li> <li>Long term impacts on residents due to visual impacts and culvert maintenance are significant</li> </ul>                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"> <li>Impacts are minor and mostly temporary, within the construction period</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"> <li>No significant social impacts of plantings at stormwater facilities</li> </ul>                                                                                                                                                                          |
| Economic Considerations                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                |
| Capital costs                                                               | <ul style="list-style-type: none"> <li>Moderate to high capital cost related to new pipe infrastructure, earthworks and plantings, as well as likely relocation of existing pipe infrastructure</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Proficient SUE investigation prior to design work can minimize unexpected existing pipe/utility interferences</li> </ul>                                                                                                                                                      | <ul style="list-style-type: none"> <li>Moderate to high capital cost related to new pipe infrastructure, earthworks and plantings, as well as likely relocation of existing pipe infrastructure</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Proficient SUE investigation prior to design work can minimize unexpected existing pipe/utility interferences</li> </ul>                                                                                               | <ul style="list-style-type: none"> <li>Low capital cost relative to other alternatives</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Costs may vary depending on extents and types of plantings</li> </ul>                             |
| Maintenance and operating costs                                             | <ul style="list-style-type: none"> <li>Low to moderate maintenance costs associated with replacing filter media, unclogging perforated pipes</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Pre-treatment of stormwater with grassed filter strips can prevent some clogging of perforated pipes</li> </ul>                                                                                                                                                                                                                  | <ul style="list-style-type: none"> <li>Low to moderate maintenance costs associated with unclogging perforated pipes</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Pre-treatment of stormwater with grassed filter strips can prevent some clogging of perforated pipes</li> </ul>                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Low maintenance costs with native, sustainable plantings</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Lower maintenance plants will minimize costs of maintenance and/or replanting</li> </ul> |
| Impact on future development and growth                                     | <ul style="list-style-type: none"> <li>Retrofit R.O.W. with bioswales may dictate R.O.W. standards for future development</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>On-site control requirements for any future intensification within the watershed would mitigate negative impacts on the LID</li> </ul>                                                                                                                                                                                                              | <ul style="list-style-type: none"> <li>Retrofit R.O.W. with perforated pipes and soakaway pits may dictate R.O.W. standards for future development</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>On-site control requirements for any future intensification within the watershed would mitigate negative impacts on the LID</li> </ul>                                                                                                                              | N/A                                                                                                                                                                                                                                                                                            |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"> <li>Bioswales are a moderate to high capital cost for retrofit but may add value to a neighbourhood</li> <li>Due to poor infiltration within the drainage area, bioswales within the R.O.W. are not a preferred option</li> </ul>                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>Perforated pipes and soakaway pits are a moderate to high capital cost for retrofit</li> <li>Due to poor infiltration within the drainage area, Infiltration in the R.O.W. is not the preferred option</li> </ul>                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"> <li>This alternative is not preferred because a wet pond is not a preferred option for this site</li> </ul>                                                                                                                                                 |
| Results of Alternative Evaluation                                           | <ul style="list-style-type: none"> <li>This alternative is not preferred because bioswales cannot provide the required level of water quality and erosion control.</li> <li>Another alternative would need to be implemented in conjunction with bioswales in order to meet SWM objectives, making this alternative economically inefficient.</li> <li>The construction and maintenance of bioswales will create short and long term accessibility and visual impacts on residents.</li> </ul>                                                                                      | <ul style="list-style-type: none"> <li>This alternative is not preferred because infiltration in R.O.W.s cannot provide the required level of water quality and erosion control.</li> <li>Another alternative would need to be implemented in conjunction with infiltration in R.O.W.s in order to meet SWM objectives, making this alternative economically inefficient.</li> <li>The construction of infiltration pipes in R.O.W.s will create short term accessibility, visual and noise impacts on residents.</li> </ul> |                                                                                                                                                                                                                                                                                                |

| Criteria                                                         | Alternatives for Uncontrolled Outlet #112                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                  |  |
|------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|--|
|                                                                  | Cooling Trench                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                  |  |
| Alternative Description                                          | <ul style="list-style-type: none"><li>Excavation of a trench between the pond control structure maintenance hole and the outlet</li><li>Modification of outlet piping infrastructure to discharge into trench</li><li>Installation of stone material and restoration of ground surface</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"><li></li></ul> |  |
| Location in Treatment Train                                      | End of Pipe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                  |  |
| Target SWM Objective(s)                                          | Temperature Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                  |  |
| Technical Considerations                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                  |  |
| Constructability and accessibility                               | <ul style="list-style-type: none"><li>Feasible construction and accessibility is adequate</li><li>Construction footprint is relatively small</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Erosion and sediment control plans required</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"><li></li></ul> |  |
| Ability to meet stormwater management objective(s)               | <ul style="list-style-type: none"><li>Cooling trenches can be effective in decreasing the temperature of the outlet water</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Thermal mitigation would be best achieved with a combination of LID methods</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li></li></ul> |  |
| Engineering best practises / innovative solution                 | <ul style="list-style-type: none"><li>Cooling trenches are a recent best management practice</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Thermal mitigation can be enhanced overall with LIDs within the contributing watershed</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"><li></li></ul> |  |
| Summary / Recommendations                                        | <ul style="list-style-type: none"><li>Technically feasible with a small construction footprint</li><li>A cooling trench would help with mitigating the temperature impacts of the SWM pond</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"><li></li></ul> |  |
| Natural Environment                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                  |  |
| Impacts to wildlife and vegetation habitats                      | <ul style="list-style-type: none"><li>Existing vegetation in the work area will be cleared</li><li>All effected areas will be restored and can be planted to replace removed vegetation</li><li>Results in a net neutral effect to terrestrial habitat</li><li>Reduction of temperature released into the downstream cool-water watercourse will improve the native aquatic habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Appropriate erosion and sediment control measures will be undertaken during construction to reduce any negative impacts to the downstream watercourse</li><li>Restoration plans will be developed to restore the surrounding areas impacted by construction</li></ul> | <ul style="list-style-type: none"><li></li></ul> |  |
| Impacts / improvements based on SAR / ESA                        | <ul style="list-style-type: none"><li>There are opportunities to improve the habitat quality of the receiving watercourse by reducing the temperature of flows entering the watercourse</li><li>Cooling effects are very beneficial for Redside Dace habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Effects could be mitigated with appropriate screens and outflow velocities</li><li>Further consultation with the MNR regarding SAR will occur prior to the detailed design of the retrofit</li></ul>                                                                                                                                                                                         | <ul style="list-style-type: none"><li></li></ul> |  |
| Summary / Recommendations                                        | <ul style="list-style-type: none"><li>A cooling trench at the pond outlet is a relatively simple alternative to mitigate temperatures impacts of the wet pond for the achievement of temperature control</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"><li></li></ul> |  |
| Social Impacts                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                  |  |
| Requirement of easements or purchase of private lands            | <ul style="list-style-type: none"><li>Sufficient space is available within the proposed pond block</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li></li></ul> |  |
| Impacts to public and private properties due to construction and | <ul style="list-style-type: none"><li>Noise and visual impacts associated with construction for the residences backing onto proposed SWM facility block</li></ul> <b>Mitigation/Compensation/Enhancement</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                  |  |

| Criteria                                | Alternatives for Uncontrolled Outlet #112                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                  |  |
|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|--|
|                                         | Cooling Trench                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                  |  |
| operations                              | <b>Measures</b> <ul style="list-style-type: none"><li>Construction management plan, including restrictions on hours may reduce inconveniences associated with construction</li></ul>                                                                                                                                                                                                                                                                                         |                                                  |  |
| Effect on public safety                 | <ul style="list-style-type: none"><li>The cooling trench will not have any affects on public safety once constructed</li><li>During construction there is a potential safety risk due to excavation if a member of the public was to enter the site</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>The construction site should be secured during and after construction hours with warning signs and fencing</li></ul> | <ul style="list-style-type: none"><li></li></ul> |  |
| Summary / Recommendations               | <ul style="list-style-type: none"><li>There are no long term social impacts associated with the cooling trench</li><li>Minimal disturbance to the public may occur during construction but the construction time frame will be brief</li></ul>                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li></li></ul> |  |
| Economic Considerations                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                  |  |
| Capital costs                           | <ul style="list-style-type: none"><li>Low capital cost for a relatively small excavation and materials</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Capital costs can be marginally reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required trench volume)</li></ul>                                                                                                      | <ul style="list-style-type: none"><li></li></ul> |  |
| Maintenance and operating costs         | <ul style="list-style-type: none"><li>Low maintenance cost associated with cleaning out the trench</li><li>Lower maintenance frequency; likely once per year</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Maintenance frequency should be as directed by operations manual</li></ul>                                                                                                                                  | <ul style="list-style-type: none"><li></li></ul> |  |
| Impact on future development and growth | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                  |  |
| Summary / Recommendations               | <ul style="list-style-type: none"><li>This alternative is not preferred because a wet pond is not a preferred option for this site.</li></ul>                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li></li></ul> |  |

| Table 1 –Evaluation of Conceptual Design Alternatives for Uncontrolled Outlet #162 (Uncontrolled Area) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Criteria                                                                                               | Alternatives for Uncontrolled Outlet #162                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                                                                                                        | Do Nothing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Oil-Grit Separators (OGS)                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Construct Water Quality Facility                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Alternative Description                                                                                | <ul style="list-style-type: none"><li>Stormwater runoff from the 2.15 ha minor drainage area will continue to be released into the receiving watercourse uncontrolled</li></ul>                                                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"><li>One (1) unit connected to the minor system prior to final control and outfall</li></ul>                                                                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"><li>Loss of current land use including clearing of vegetation</li><li>Significant earthworks operations</li><li>Remove and replace section of sewer and outlet infrastructure</li><li>Provision of wet habitat area adjacent to receiving watercourse</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Location in Treatment Train                                                                            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | End of Pipe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Target SWM Objective(s)                                                                                | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Quality Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Technical Considerations                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Constructability and accessibility                                                                     | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"><li>Locations are accessible as OGS units could be installed upstream of the outfall at a manhole within the municipal roadway; construction area is relatively small</li><li>Construction considerations include traffic interruptions and short term road closures</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Traffic management plans may reduce inconveniences associated with construction</li></ul> | <ul style="list-style-type: none"><li>Access to the site is feasible</li><li>Redirection of servicing will be required to outlet to constructed quality pond</li><li>Site is owned by TRCA; permission for works is required</li><li>Staging area can be within the valleylands or within municipal R.O.W.s</li><li>Tree removals would be required in order to construct the facility</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Restoration of the construction/staging area will be required</li></ul>                                                                                                                                                                                                                     |
| Ability to meet stormwater management objective(s)                                                     | <ul style="list-style-type: none"><li>Does not provide for or meet the stormwater management objectives of the City and/or TRCA for water quality, erosion or quantity control</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul>                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>OGS units may be able to provide all required stormwater quality objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Pre-treatment of stormwater runoff with LIDs will enhance the performance of the OGS</li></ul>                                                                                                                                                                                 | <ul style="list-style-type: none"><li>A wet pond facility would be capable of fully meeting the requirements for quality control</li><li>Increased water temperature would occur as a result of the wet pond facility</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>A wet pond facility for quantity control could be constructed to include active storage capacity that will provide quantity and erosion control within a single footprint</li><li>Quality control can be enhanced with LIDs that infiltrate runoff within the drainage area</li><li>Cooling measures could be installed to reduce water temperatures, prior to discharging to the environment</li></ul>                                                      |
| Engineering best practises / innovative solution                                                       | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"><li>OGS and similar units are noted as best management practices</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Pre-treatment of stormwater runoff with LIDs will enhance the performance of the OGS</li><li>Filtration cartridge options may be used rather than traditional OGS to target more specific pollutants</li></ul>                                                                                | <ul style="list-style-type: none"><li>Typically more traditional SWM approach</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Quality control can be enhanced with LIDs that infiltrate runoff within the drainage area</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Summary / Recommendations                                                                              | <ul style="list-style-type: none"><li>Does not provide for or meet the stormwater management objectives of the City and/or TRCA for water quality, erosion or quantity control</li></ul>                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>OGS can be effective, low-space option to provide water quality control</li></ul>                                                                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"><li>Technically feasible to provide quality control, however a wet pond would result in additional temperature control issues</li><li>Construction of a surface detention facility can fully meet the quality control SWM criteria; construction fairly extensive</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Natural Environment                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Impacts to wildlife and vegetation habitats                                                            | <ul style="list-style-type: none"><li>Current condition of wildlife and vegetation habitats will not change; however if the release rate of uncontrolled stormwater into the receiving watercourse causes future erosion in the watercourse or impacts the quality of the water in the watercourse, this could have negative impact on the future condition of wildlife and vegetation habitats</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul> | <ul style="list-style-type: none"><li>OGS does not physically interfere with the existing outlet or impact the surrounding forested area and improves water quality prior to discharge to the watercourse</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation required</li></ul>                                                                                                                                                       | <ul style="list-style-type: none"><li>Existing vegetation will be cleared including the cultural meadow</li><li>Results in a loss of terrestrial habitat and some adult trees</li><li>There are opportunities to improve the habitat quality of the receiving watercourse by reducing the sediment loading and potential contaminate exposure of the receiving watercourse</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Restoration plans will be developed to restore the surrounding areas impacted by construction</li><li>Riparian and aquatic vegetation can be planted on the berms and within the wet pond facility which will also aid in reducing the temperature impacts of the surface detention of runoff</li></ul> |
| Impacts / improvements based on SAR / ESA                                                              | <ul style="list-style-type: none"><li>The current condition of wildlife and vegetation habitats will not change; however if the release of uncontrolled stormwater into the receiving watercourse causes future erosion in the watercourse or impacts the quality of the water in the watercourse, this could have a negative impact on Redside Dace habitat.</li></ul>                                                                                                                                                                | <ul style="list-style-type: none"><li>Meeting water quality criteria will improve water quality of downstream receiving waters</li><li>Little to no effect on temperature mitigation</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Use of OGS can be enhanced with pre-treatment using LIDs throughout minor system</li></ul>                                                                                                                  | <ul style="list-style-type: none"><li>There are opportunities to improve the habitat quality of the receiving watercourse by reducing the sediment loading of the watercourse</li><li>The receiving watercourse has been identified to be Redside Dace habitat</li><li>Wet ponds can provide reduction of stormwater temperature with the inclusion</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                          |



| Criteria                                                                           | Alternatives for Uncontrolled Outlet #162                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                    | Do Nothing                                                                                                                                                                                                                            | Oil-Grit Separators (OGS)                                                                                                                                                                                                                                                                                                                                                                                                                            | Construct Water Quality Facility                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                                                                                    | <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>No mitigation undertaken</li> </ul>                                                                                                        | watershed                                                                                                                                                                                                                                                                                                                                                                                                                                            | of a bottom draw outlet and shading from vegetation<br><b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Further consultation with the MNR regarding SAR will occur prior to the detailed design of the retrofit</li> <li>Stringent construction practices can be implemented to reduce the possibility of introducing invasive species to the ecosystem during construction</li> </ul>                                                                                                                                                      |
| <b>Summary / Recommendations</b>                                                   | <ul style="list-style-type: none"> <li>Existing vegetation and forest adjacent to the uncontrolled outlet provides terrestrial habitat and will remain as in current condition</li> </ul>                                             | <ul style="list-style-type: none"> <li>OGS offers improvements to water quality</li> <li>Used in conjunction with LIDs, OGS can improve water conditions for SAR</li> </ul>                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"> <li>A quality pond can be beneficial to downstream receiving waters but will alter any existing habitat within the construction area including the removal of trees</li> </ul>                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Social Impacts</b>                                                              |                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Requirement of easements or purchase of private lands</b>                       | N/A                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Likely not required; preference to install and maintain OGS within municipal R.O.W., where maintenance is easily accessible</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not applicable</li> </ul>                                                                                                                                                   | <ul style="list-style-type: none"> <li>Likely not required for the construction and maintenance of a SWM facility for UC #162</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Land requirements would be confirmed through conceptual design</li> </ul>                                                                                                                                                                                                                                                                         |
| <b>Impacts to public and private properties due to construction and operations</b> | N/A                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Roadway interference and/or short-term closure would be expected for the installation of OGS units</li> <li>Temporary interference to be expected on roadways during maintenance (approximately once a year)</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Traffic management plans may reduce inconveniences associated with construction</li> </ul> | <ul style="list-style-type: none"> <li>Noise and visual impacts associated with construction for the residences backing onto proposed SWM facility block</li> <li>A construction staging area may need to be set up within the pond block, therefore there would be no further impacts</li> <li>Coordination required with TRCA</li> <li>SWM facility would likely be on public recreational park land</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Construction management plan, including restrictions on hours</li> </ul> |
| <b>Effect on public safety</b>                                                     | N/A                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Installed OGS does not pose threats to public safety</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>No mitigation undertaken</li> </ul>                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>By building to the required side slope and depth criteria, the wet pond facility should not pose a threat to public safety</li> <li>There are no trails though this green space and public access is limited, thereby reducing the exposure of public to the facility</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Flattened slopes, warning signs, and fencing (if required) can provide measures of safety</li> </ul>                                                               |
| <b>Summary / Recommendations</b>                                                   | <ul style="list-style-type: none"> <li>The ‘Do Nothing’ alternative has no social impacts</li> </ul>                                                                                                                                  | <ul style="list-style-type: none"> <li>OGS presents few and short-term impacts associated with installation and maintenance</li> </ul>                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"> <li>Construction of a wet pond facility would be a longer-term construction project with potential noise, traffic and visual impacts</li> <li>Loss of park space</li> </ul>                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Economic Considerations</b>                                                     |                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Capital costs</b>                                                               | <ul style="list-style-type: none"> <li>No action may result in greater capital expenses in the future</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Not applicable</li> </ul> | <ul style="list-style-type: none"> <li>Relatively low capital cost for installation of one (1) unit and associated infrastructure works</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Capital cost of OGS units can be reduced if stormwater is pre-treated with LIDs (thus scaling down required OGS size)</li> </ul>                                                                       | <ul style="list-style-type: none"> <li>Moderate to high capital cost for earthworks, grading, infrastructure components and permits</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Capital costs can be marginally reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required quality control volumes and footprint)</li> </ul>                                                                                                                                                       |
| <b>Maintenance and operating costs</b>                                             | N/A                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Fairly low maintenance cost and frequency; approximately annually</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Maintenance frequency of OGS units should not decrease with increased pre-treatment</li> </ul>                                                                                                                                        | <ul style="list-style-type: none"> <li>Moderate maintenance cost and frequency; likely seasonally</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Maintenance frequency should be as directed by operations manual</li> <li>Maintenance frequency can be reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required quality control volume)</li> </ul>                                                                                                                                 |
| <b>Impact on future development and growth</b>                                     | N/A                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Size of OGS is static once installed and would require upgrading if a larger drainage area is directed to it (in order to meet water quality criteria)</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Additional OGS units may be installed in the future to correspond with growth</li> </ul>                                                         | <ul style="list-style-type: none"> <li>No impact, but detention facility would require expansion if contributing land use was to intensify</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>On-site control requirements for any intensified development within the facility’s watershed would mitigate further expansion</li> </ul>                                                                                                                                                                                             |
| <b>Summary / Recommendations</b>                                                   | <ul style="list-style-type: none"> <li>‘Do nothing’ may postpone required works and increase future costs</li> </ul>                                                                                                                  | <ul style="list-style-type: none"> <li>Installation of OGS units is a low cost solution for achievement of the required SWM quality criteria</li> </ul>                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"> <li>Construction of a wet pond facility would present moderate to high capital costs for achievement of quality control</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Results of Alternative Evaluation</b>                                           | <ul style="list-style-type: none"> <li>This alternative is not preferred because the alternative does not meet the stormwater management objectives</li> </ul>                                                                        | <ul style="list-style-type: none"> <li>This is a preferred alternative due to the lower cost, small disturbance area and ability to provide full quality control</li> </ul>                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"> <li>This is not a preferred alternative due to the loss of trees and public park land that would occur</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                  |

| Criteria | Alternatives for Uncontrolled Outlet #162 |                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|          | Do Nothing                                | Oil-Grit Separators (OGS)                                                                                                     | Construct Water Quality Facility                                                                                                                                                                                                                                                                                                                                                                             |
|          |                                           | <ul style="list-style-type: none"><li>This alternative can be implemented with little to no loss of existing trees.</li></ul> | <ul style="list-style-type: none"><li>A wet pond facility would be capable of fully meeting the requirements for quality control, however would cause additional issues related to temperature control</li><li>Retaining existing trees is a high priority for the City of Markham; however tree loss is probable for construction of this alternative. Therefore, this is not a preferred option.</li></ul> |

| Criteria                                           | Alternatives for Uncontrolled Outlet #162                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                    | Bottom Draw Outlet in a Wet Pond                                                                                                                                                                                                                                                                                                             | Construct Extended Detention Facility                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Underground Storage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Alternative Description                            | <ul style="list-style-type: none"> <li>Construct a bottom draw outlet to reduce temperatures of discharged water.</li> <li>Only applicable if the area is converted into a wet pond</li> </ul>                                                                                                                                               | <ul style="list-style-type: none"> <li>Loss of current land use including clearing of vegetation</li> <li>Significant earthworks</li> <li>Remove and replace section of existing sewer and outlet infrastructure</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"> <li>Installed at pond block location or within park areas located within drainage area</li> <li>Installed at an area of higher elevation within the site; outside of the designated Valleylands area</li> <li>Underground storage tanks will capture and detain stormwater and release over an extended time period</li> <li>Infiltration type underground tanks will allow for infiltration during detention period</li> <li>May need water quality control prior to infiltrating (if proposed)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                            |
| Location in Treatment Train                        | End of Pipe                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Target SWM Objectives                              | Temperature Control                                                                                                                                                                                                                                                                                                                          | Erosion Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Erosion and Temperature Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Technical Considerations                           |                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Constructability and accessibility                 | <ul style="list-style-type: none"> <li>Constructability is simple, pending adequate depth of the wet pond</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Greater depth enhances the thermal mitigation function of the bottom draw outlet</li> </ul>                                  | <ul style="list-style-type: none"> <li>Access to site is feasible</li> <li>Redirection of servicing will be required to outlet to constructed extended detention facility</li> <li>Site is owned by TRCA; permission for works is required</li> <li>Staging area can be within the valleylands or within municipal R.O.W.s</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Restoration of the construction/staging area will be required</li> </ul>                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Footprint may be large but is constructible within TRCA- owned pond block lands;</li> <li>Footprint is smaller for infiltration facilities that can be proposed in parkland;</li> <li>Constructability is low to moderate;</li> <li>Still allows for use of land at-grade;</li> <li>Requires reorganization of storm infrastructure/outfalls;</li> <li>Based on soil mapping, the soil in the drainage area is conducive to infiltration</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Tanks with infiltration capabilities provide additional benefits to erosion and temperature control</li> <li>Constructability would likely be increased by incorporating several underground tanks rather than one central system</li> <li>Site specific soil testing is required to confirm suitability of infiltration</li> </ul> |
| Ability to meet stormwater management objective(s) | <ul style="list-style-type: none"> <li>Bottom draw outlets can be effective in decreasing the temperature of the outlet water</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Thermal mitigation would be best achieved with a combination of LID methods</li> </ul>                   | <ul style="list-style-type: none"> <li>An extended detention facility would be capable of fully meeting the requirements for erosion control detention</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>A extended detention facility for erosion control could be incorporated with a wet pond and sized to provide quality and quantity control within a single pond block reducing construction footprint</li> <li>Erosion control can be enhanced with LIDs that detain and/or infiltrate runoff within the drainage area</li> <li>Extended detention facilities could be enhanced with outlets which consider thermal mitigation techniques, to improve water quality</li> </ul>                                                  | <ul style="list-style-type: none"> <li>Underground tanks, especially with infiltration capabilities, are effective for providing quality and erosion control</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Longer detention times can enhance the erosion control</li> <li>Infiltration type underground tanks will allow for infiltration during detention period</li> <li>May need water quality control prior to infiltrating (if proposed)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                         |
| Engineering best practises / innovative solution   | <ul style="list-style-type: none"> <li>Bottom draw outlets in combination with cooling trenches are recent best management practices</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Thermal mitigation can be enhanced overall with LIDs within the contributing watershed</li> </ul> | <ul style="list-style-type: none"> <li>Typically more traditional SWM approach</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Erosion control can be enhanced with LIDs that detain and/or infiltrate runoff within the drainage area</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"> <li>Underground tanks, including infiltration, are noted as best management practices</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Maintenance of underground tanks is more extensive than at-grade alternatives</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Summary / Recommendations                          | <ul style="list-style-type: none"> <li>A bottom draw outlet is a recommended outlet alternative for the wet pond to achieve required temperature control</li> </ul>                                                                                                                                                                          | <ul style="list-style-type: none"> <li>Technically feasible</li> <li>Construction of an extended detention facility can fully meet the erosion control SWM criteria</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"> <li>Technically feasible, requiring more intrusive maintenance</li> <li>Useful for maintaining land uses at-grade and visually not intrusive</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Natural Environment                                |                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Impacts to wildlife and vegetation habitats        | <ul style="list-style-type: none"> <li>No impact to vegetation</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Effects could be mitigated with appropriate screens and outflow velocities to avoid harm to any species which may be found in the wet pond</li> </ul>                   | <ul style="list-style-type: none"> <li>Existing vegetation will be cleared in the work area</li> <li>Results in a loss of terrestrial habitat</li> <li>There are opportunities to improve the habitat quality of the receiving watercourse by reducing the peak flows entering the watercourse and thereby reducing erosion</li> <li>TRCA policy does not allow construction of new facilities within the Valleylands.</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Restoration plans will be developed to restore the surrounding areas impacted by construction</li> <li>Vegetation can be planted on the perimeter of the extended detention facility which will also aid in reducing the temperature impacts of the</li> </ul> | <ul style="list-style-type: none"> <li>May require removal of some vegetation depending on specific location</li> <li>Once installed, less intrusive than other alternatives because of location below grade</li> <li>Installed at an area of higher elevation within the TRCA-owned pond block lands; outside of the designated Valleylands area</li> </ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"> <li>Restoration plan required if loss of vegetation expected due to construction</li> </ul>                                                                                                                                                                                                                                                                                                                                                                           |

| Criteria                                                                    | Alternatives for Uncontrolled Outlet #162                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                             | Bottom Draw Outlet in a Wet Pond                                                                                                                                                                                                                                                                                        | Construct Extended Detention Facility                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Underground Storage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                                                                             |                                                                                                                                                                                                                                                                                                                         | surface detention of runoff <ul style="list-style-type: none"><li>Construction site will be designed to minimize vegetation and habitat loss, and avoid the clearing of adult trees</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Impacts / improvements based on SAR / ESA                                   | <ul style="list-style-type: none"><li>Cooling effects are very beneficial for Redside Dace habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Alternative can be enhanced with LIDs within the watershed and planting techniques within the wet pond</li></ul> | <ul style="list-style-type: none"><li>There are opportunities to improve the habitat quality of the receiving watercourse by reducing the erosion and thereby sediment loading of the receiving watercourse</li><li>The receiving watercourse has been identified to be Redside Dace habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Further consultation with the MNR regarding SAR will occur prior to the detailed design of the retrofit</li><li>Thermal mitigation via other alternatives required</li><li>Stringent construction practices can be implemented to reduce the possibility of introducing invasive species to the ecosystem during construction</li></ul> | <ul style="list-style-type: none"><li>Underground tanks may improve the habitat quality of the receiving watercourse by reducing the erosion and thereby sediment loading of the receiving watercourse</li><li>The receiving watercourse has been identified to be Redside Dace habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Further consultation with the MNR regarding SAR will occur prior to the detailed design of the retrofit</li><li>Stringent construction practices can be implemented to reduce the possibility of introducing invasive species to the ecosystem during construction</li></ul> |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>Bottom draw outlet is a simple alternative to incorporate into a wet pond for the achievement of temperature control</li></ul>                                                                                                                                                    | <ul style="list-style-type: none"><li>An extended detention facility can be beneficial to downstream receiving waters but will alter any existing habitat within the construction area</li><li>TRCA policy does not allow construction of new facilities within the Valleylands.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>Underground tanks are a long-term non-invasive alternative for providing quality and erosion control</li><li>Installed at an area of higher elevation within the TRCA-owned pond block lands; outside of the designated Valleylands area</li><li></li></ul>                                                                                                                                                                                                                                                                                                                                                                        |
| Social Impacts                                                              |                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Requirement of easements or purchase of private lands                       | N/A                                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"><li>Likely not required for the construction and maintenance of a SWM facility for UC #162</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Land requirements would be confirmed through conceptual design</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>Likely not required for the construction and maintenance of an underground storage tank facility for UC #162</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Land requirements would be confirmed through conceptual design</li></ul>                                                                                                                                                                                                                                                                                                                                          |
| Impacts to public and private properties due to construction and operations | <ul style="list-style-type: none"><li>Impacts are related to the construction of the wet pond</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Bottom draw outlet itself does not present additional impacts</li></ul>                                               | <ul style="list-style-type: none"><li>Noise and visual impacts associated with construction for the residences backing onto proposed SWM facility block</li><li>A construction staging area may need to be set up within the pond block, therefore there would be no further impacts</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Construction management plan, including restrictions on hours</li></ul>                                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"><li>Noise and visual impacts associated with construction for the residences backing onto proposed SWM facility block</li><li>A construction staging area may need to be set up within the pond block, therefore there would be no further impacts</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Construction management plan, including restrictions on hours</li></ul>                                                                                                                                                                                                         |
| Effect on public safety                                                     | N/A                                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"><li>By building to the required slope and depth criteria, the extended detention facility should not pose a threat to public safety</li><li>There are no trails though this green space so public access is limited, reducing the exposure of public to the facility</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Adequate slopes, warning signs, and fencing (if required) can provide measures of safety</li></ul>                                                                                                                                                                                                                            | <ul style="list-style-type: none"><li>No public safety concerns beyond construction period</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Proper signage and safety measures to be set up for construction period, especially around park areas</li></ul>                                                                                                                                                                                                                                                                                                                                                           |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>There are no social impacts associated with the bottom draw outlet</li></ul>                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>Construction of an extended detention facility would be a longer-term construction project with potential noise, traffic and visual impacts</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"><li>Underground tanks are proposed to be located in the pond block and / or public parks; not intrusive to the public after construction</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Economic Considerations                                                     |                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Capital costs                                                               | <ul style="list-style-type: none"><li>Low capital cost as standalone item</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation required</li></ul>                                                                                                          | <ul style="list-style-type: none"><li>Moderate to high capital cost for earthworks, grading, infrastructure components, permits</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Capital costs can be marginally reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required detention volumes)</li></ul>                                                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"><li>Moderate capital cost related to storage tank infrastructure</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Efficient tank design to minimize capital costs</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                         |
| Maintenance and operating costs                                             | <ul style="list-style-type: none"><li>Low maintenance costs as standalone; costs associated with maintenance of wet pond</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Maintenance due to clogging can be reduced with proper screens</li></ul>                   | <ul style="list-style-type: none"><li>Lower maintenance cost and frequency; likely every few years</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Maintenance frequency should be as directed by operations manual</li><li>Maintenance frequency can be reduced by providing pre-treatment for sediment removal</li></ul>                                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>Low maintenance costs associated with cleaning out tanks as per operations manual or in event of clogging</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Can prevent clogging with additional pre-treatment techniques</li></ul>                                                                                                                                                                                                                                                                                                                                              |
| Impact on future development and growth                                     | N/A                                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"><li>No impact, but extended detention facility would require expansion if contributing land use was to intensify</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>On-site control requirements for any intensified development within the facility's</li></ul>                                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>No impact, but underground tanks would require expansion if contributing land use was to intensify</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>On-site control requirements for any future intensification within the watershed would</li></ul>                                                                                                                                                                                                                                                                                                                            |



| Criteria                          | Alternatives for Uncontrolled Outlet #162                                                                                                                           |                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                   | Bottom Draw Outlet in a Wet Pond                                                                                                                                    | Construct Extended Detention Facility                                                                                                                                                             | Underground Storage                                                                                                                                                                                                                                                                                                                                                                   |
|                                   |                                                                                                                                                                     | watershed would mitigate further expansion                                                                                                                                                        | mitigate further expansion; potential for cost sharing                                                                                                                                                                                                                                                                                                                                |
| Summary / Recommendations         | <ul style="list-style-type: none"><li>Bottom draw outlet is a cost effective alternative to incorporate into wet pond design to meet temperature criteria</li></ul> | <ul style="list-style-type: none"><li>Construction of an extended detention facility would present moderate to high capital costs for achievement of quantity control</li></ul>                   | <ul style="list-style-type: none"><li>Underground tanks provide moderate to high capital and maintenance costs for the achievement of quality and erosion control</li><li>A larger footprint may be required with the use of this alternative</li></ul>                                                                                                                               |
| Results of Alternative Evaluation | <ul style="list-style-type: none"><li>This alternative is not preferred because a wet pond is not a preferred option for this site</li></ul>                        | <ul style="list-style-type: none"><li>This is not a preferred alternative because in accordance with TRCA policy, construction of new facilities is not allowed within the Valleylands.</li></ul> | <ul style="list-style-type: none"><li>This alternative is preferred because it maintains the use of land at grade and is able to be constructed within the TRCA-owned pond block lands; outside of the designated Valleylands area</li><li>Challenges include: a potential shallow water table and limitations on storage volume due to underground tank depth limitations.</li></ul> |

| Criteria                                              | Alternatives for Uncontrolled Outlet #162                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |
|-------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
|                                                       | Bioswales                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Infiltration in Right-of-Ways (R.O.W.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| Alternative Description                               | <ul style="list-style-type: none"><li>Construct bioswales within the road right-of-ways within the facility drainage area</li><li>Bioswales to contain native plantings and subdrains</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"><li>Install perforated secondary pipe within existing storm sewer systems to allow for infiltration through linear soakaway pits</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |
| Location in Treatment Train                           | Conveyance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |
| Target SWM Objective(s)                               | Quality, Erosion and Temperature Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |
| Technical Considerations                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |
| Constructability and accessibility                    | <ul style="list-style-type: none"><li>Construction area is extensive and pipe networks are more intricate, requiring coordination with existing infrastructure</li><li>Road right of ways need to be conducive to grading and space criteria for bioswales</li><li>Based on soil mapping, the soil in the drainage area is conducive to infiltration</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Bioswales may be more suited as supplementary water quality / erosion / temperature control measures, where constructability and retrofit are least disruptive to existing infrastructure</li><li>Site specific soil testing is required to confirm suitability of infiltration</li></ul> | <ul style="list-style-type: none"><li>Construction area is extensive and many secondary infiltration pipes would require to be installed to achieve SWM criteria</li><li>Requires coordination with existing infrastructure and utilities</li><li>Based on soil mapping, the soil in the drainage area is conducive to infiltration</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may be more suited as supplementary water quality / erosion / temperature control measures, where constructability and retrofit are least disruptive to existing infrastructure</li><li>Site specific soil testing is required to confirm suitability of infiltration</li></ul> |  |
| Ability to meet stormwater management objective(s)    | <ul style="list-style-type: none"><li>Bioswales are more effective when used within a treatment train to achieve the stormwater objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Additional pre-treatment will enhance the function of bioswales, to reduce clogging of the underdrain pipes</li></ul>                                                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may are more effective when used within a treatment train to achieve the stormwater objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Additional pre-treatment will enhance the function of the perforated pipes, to reduce clogging</li></ul>                                                                                                                                                                                                                                                                                                                                                                       |  |
| Engineering best practises / innovative solution      | <ul style="list-style-type: none"><li>Bioswales are innovative solutions within stormwater management conveyance systems</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Enhanced with further use of LIDs such as vegetated filter strips</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may are innovative solutions within stormwater management</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Enhanced with further use of LIDs such as vegetated filter strips</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |
| Summary / Recommendations                             | <ul style="list-style-type: none"><li>Bioswales are effective as part of a treatment train and where retrofit does not greatly interfere with existing infrastructure</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may are effective as part of a treatment train and where retrofit does not greatly interfere with existing infrastructure</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
| Natural Environment                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |
| Impacts to wildlife and vegetation habitats           | <ul style="list-style-type: none"><li>May require removal of some vegetation depending on specific location</li><li>May present phosphorus issues if not properly designed and/or maintained</li><li>Bioswales may decrease water temperature, providing benefits to the aquatic habitat of the receiving watercourse</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Planted bioswales will enhance neighbourhoods with additional vegetated areas</li></ul>                                                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>May require removal of some vegetation depending on specific location; likely few impacts to existing wildlife and vegetation habitats</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Areas disturbed during construction will be restored.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
| Impacts / improvements based on SAR / ESA             | <ul style="list-style-type: none"><li>Bioswales may decrease water temperature, providing benefits to the aquatic habitat of the receiving watercourse including Redside Dace.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Bioswales may be more suited as supplementary water temperature control measures</li></ul>                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>Underground tanks may decrease water temperature, providing benefits to the aquatic habitat of the receiving watercourse including Redside Dace.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may be more suited as supplementary water temperature control measures</li></ul>                                                                                                                                                                                                                                                                                                                                             |  |
| Summary / Recommendations                             | <ul style="list-style-type: none"><li>Bioswales that are properly designed to avoid phosphorus loading provide positive impact on the natural environment</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits present few impact on the natural environment</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |
| Social Impacts                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |
| Requirement of easements or purchase of private lands | <ul style="list-style-type: none"><li>To be constructed within municipal R.O.W.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"><li>To be constructed within municipal R.O.W.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |
| Impacts to public and private                         | <ul style="list-style-type: none"><li>Impacts may include temporary, minor traffic and noise issues and significant visual</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>Impacts may include temporary, minor traffic and noise issues due to construction within the</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |

| Criteria                                      | Alternatives for Uncontrolled Outlet #162                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |
|-----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
|                                               | Bioswales                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Infiltration in Right-of-Ways (R.O.W.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |
| properties due to construction and operations | <div>nuisances due to construction within the residential streets</div> <div><div></div>Bioswales are likely to face public opposition due to the maintenance requirements, visual disruption to an otherwise “clean” front lawn and inconvenience of culverts under driveways</div> <div>Mitigation/Compensation/Enhancement Measures</div> <div><div></div>Appropriate construction and traffic management schedule to be adhered to</div>                                                 | <div>residential streets</div> <div>Mitigation/Compensation/Enhancement Measures</div> <div><div></div>Appropriate construction and traffic management schedule to be adhered to</div>                                                                                                                                                                                                                                                                                                                                     |  |
| Effect on public safety                       | <div><div></div>No public safety concerns beyond construction period</div> <div>Mitigation/Compensation/Enhancement Measures</div> <div><div></div>Proper signage and safety measures to be set up for construction period</div>                                                                                                                                                                                                                                                             | <div><div></div>No public safety concerns beyond construction period</div> <div>Mitigation/Compensation/Enhancement Measures</div> <div><div></div>Proper signage and safety measures to be set up for construction period</div>                                                                                                                                                                                                                                                                                           |  |
| Summary / Recommendations                     | <div><div></div>Impacts during construction are temporary and mostly minor</div> <div><div></div>Long term impacts on residents due to visual impacts and pipe maintenance are significant</div>                                                                                                                                                                                                                                                                                             | <div><div></div>Impacts are minor and mostly temporary, within the construction period</div>                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
| Economic Considerations                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |
| Capital costs                                 | <div><div></div>Moderate to high capital cost related to new pipe infrastructure, earthworks and plantings, as well as likely relocation of existing pipe infrastructure</div> <div>Mitigation/Compensation/Enhancement Measures</div> <div><div></div>Proficient SUE investigation prior to design work can minimize unexpected existing pipe/utility interferences</div>                                                                                                                   | <div><div></div>Moderate to high capital cost related to new pipe infrastructure, earthworks and plantings, as well as likely relocation of existing pipe infrastructure</div> <div>Mitigation/Compensation/Enhancement Measures</div> <div><div></div>Proficient SUE investigation prior to design work can minimize unexpected existing pipe/utility interferences</div>                                                                                                                                                 |  |
| Maintenance and operating costs               | <div><div></div>Low to moderate maintenance costs associated with replacing filter media, unclogging perforated pipes</div> <div>Mitigation/Compensation/Enhancement Measures</div> <div><div></div>Pre-treatment of stormwater with grassed filter strips can prevent some clogging of perforated pipes</div>                                                                                                                                                                               | <div><div></div>Low to moderate maintenance costs associated with unclogging perforated pipes</div> <div>Mitigation/Compensation/Enhancement Measures</div> <div><div></div>Pre-treatment of stormwater with grassed filter strips can prevent some clogging of perforated pipes</div>                                                                                                                                                                                                                                     |  |
| Impact on future development and growth       | <div><div></div>Retrofit R.O.W. with bioswales may dictate R.O.W. standards for future development</div> <div>Mitigation/Compensation/Enhancement Measures</div> <div><div></div>On-site control requirements for any future intensification within the watershed would mitigate negative impacts on the LID</div> <div><div></div>Cost sharing can be implemented provide mutual benefits</div>                                                                                             | <div><div></div>Retrofit R.O.W. with perforated pipes and soakaway pits may dictate R.O.W. standards for future development</div> <div>Mitigation/Compensation/Enhancement Measures</div> <div><div></div>On-site control requirements for any future intensification within the watershed would mitigate negative impacts on the LID</div> <div><div></div>Cost sharing can be implemented provide mutual benefits</div>                                                                                                  |  |
| Summary / Recommendations                     | <div><div></div>Bioswales are a moderate to high capital cost for retrofit but may add value to a neighbourhood</div>                                                                                                                                                                                                                                                                                                                                                                        | <div><div></div>Perforated pipes and soakaway pits are a moderate to high capital cost for retrofit</div>                                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Results of Alternative Evaluation             | <div><div></div>This alternative is not preferred because bioswales cannot provide the required level of water quality and erosion control.</div> <div><div></div>Another alternative would need to be implemented in conjunction with bioswales in order to meet SWM objectives, making this alternative economically inefficient.</div> <div><div></div>The construction and maintenance of bioswales will create short and long term accessibility and visual impacts on residents.</div> | <div><div></div>This alternative is not preferred because infiltration in R.O.W.s cannot provide the required level of water quality and erosion control.</div> <div><div></div>Another alternative would need to be implemented in conjunction with infiltration in R.O.W.s in order to meet SWM objectives, making this alternative economically inefficient.</div> <div><div></div>The construction of infiltration pipes in R.O.W.s will create short term accessibility, visual and noise impacts on residents.</div> |  |

| Criteria                                                                    | Alternatives for Pond #42                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
|-----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
|                                                                             | Cooling Trench                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Aquatic and Riparian Plantings at Facility                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |
| Alternative Description                                                     | <ul style="list-style-type: none"><li>Excavation of a trench between the pond control structure maintenance hole and the outlet</li><li>Modification of outlet piping infrastructure to discharge into trench</li><li>Installation of stone material and restoration of ground surface</li></ul>                                                                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>Plantings to increase density and area of vegetation cover surrounding facility and within facility to provide shade for cooling of detained water</li></ul>                                                                                                                                                                                                                                                                                                            |  |
| Location in Treatment Train                                                 | End of Pipe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
| Target SWM Objective(s)                                                     | Temperature Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
| Technical Considerations                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
| Constructability and accessibility                                          | <ul style="list-style-type: none"><li>Feasible construction and accessibility is adequate</li><li>Construction footprint is relatively small</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Erosion and sediment control plans required</li></ul>                                                                                                                                                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"><li>No constructability issues anticipated with adding plantings to proposed facilities</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Plantings enhance temperature control by providing shade</li></ul>                                                                                                                                                                                                              |  |
| Ability to meet stormwater management objective(s)                          | <ul style="list-style-type: none"><li>Cooling trenches can be effective in decreasing the temperature of the outlet water</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Thermal mitigation would be best achieved with a combination of LID methods</li></ul>                                                                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"><li>Shade from plantings will reduce the temperature of stormwater at a facility</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Plantings are better used in conjunction with other cooling methods to achieve adequate temperature control</li></ul>                                                                                                                                                                  |  |
| Engineering best practises / innovative solution                            | <ul style="list-style-type: none"><li>Cooling trenches are a recent best management practice</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Thermal mitigation can be enhanced overall with LIDs within the contributing watershed</li></ul>                                                                                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"><li>Temperature control of stormwater in general is becoming an engineering best management practice in areas with sensitive habitats</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Effects of plantings can be enhanced with other methods such as use of a bottom draw outlet</li></ul>                                                                                                                             |  |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>Technically feasible with a small construction footprint</li><li>A cooling trench would help with mitigating the temperature impacts of the SWM pond</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>Plantings at stormwater management facility are a simple alternative to provide additional temperature controls</li></ul>                                                                                                                                                                                                                                                                                                                                               |  |
|                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
| Impacts to wildlife and vegetation habitats                                 | <ul style="list-style-type: none"><li>Existing vegetation in the work area will be cleared</li><li>All effected areas will be restored and can be planted to replace removed vegetation</li><li>Reduction of temperature released into the downstream cool-water watercourse will improve the native aquatic habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Appropriate erosion and sediment control measures will be undertaken during construction to reduce any negative impacts to the downstream watercourse</li><li>Restoration plans will be developed to restore the surrounding areas impacted by construction</li></ul> | <ul style="list-style-type: none"><li>Planting native species can enhance the existing wildlife and vegetation</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul>                                                                                                                                                                                                                                                         |  |
| Impacts / improvements based on SAR / ESA                                   | <ul style="list-style-type: none"><li>There are opportunities to improve the habitat quality of the receiving watercourse by reducing the temperature of flows entering the watercourse</li><li>Cooling effects are very beneficial for Redside Dace habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Effects could be mitigated with appropriate screens and outflow velocities</li><li>Further consultation with the MNR regarding SAR will occur prior to the detailed design of the retrofit</li></ul>                                                                                                                          | <ul style="list-style-type: none"><li>Providing additional shade at stormwater facilities reduces stormwater temperature which is a key benefit for Redside Dace Habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Effects of plantings can be enhanced with other methods such as use of a bottom draw outlet</li><li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li></ul> |  |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>A cooling trench at the pond outlet is a relatively simple alternative to mitigate temperatures impacts of the wet pond for the achievement of temperature control</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"><li>Plantings at stormwater facilities provide positive impacts on the natural environment (provided they are non-invasive species)</li></ul>                                                                                                                                                                                                                                                                                                                               |  |
|                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
| Requirement of easements or purchase of private lands                       | <ul style="list-style-type: none"><li>Sufficient space is available within the pond block</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |
| Impacts to public and private properties due to construction and operations | <ul style="list-style-type: none"><li>Noise and visual impacts associated with construction for the residences backing onto proposed SWM facility block</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Construction management plan, including</li></ul>                                                                                                                                                                                                                                                                                                                                                                                  | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |



| Criteria                                | Alternatives for Pond #42                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                            |  |
|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
|                                         | Cooling Trench                                                                                                                                                                                                                                                                                                                                                          | Aquatic and Riparian Plantings at Facility                                                                                                                                                                                                                                                 |  |
|                                         | restrictions on hours may reduce inconveniences associated with construction                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                            |  |
| Effect on public safety                 | <ul style="list-style-type: none"><li>The cooling trench will not have any affects on public safety once constructed</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>The construction site should be secured during and after construction hours with warning signs and fencing</li></ul>                           | <ul style="list-style-type: none"><li>Vegetation should be suitable for proposed facility and clearly indicate any water’s edge</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Vegetation at facilities must be maintained</li></ul>  |  |
| Summary / Recommendations               | <ul style="list-style-type: none"><li>There are no long term social impacts associated with the cooling trench</li><li>Minimal disturbance to the public may occur during construction but the construction time frame will be brief</li></ul>                                                                                                                          | <ul style="list-style-type: none"><li>No significant social impacts of plantings at stormwater facilities</li></ul>                                                                                                                                                                        |  |
|                                         |                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                            |  |
| Capital costs                           | <ul style="list-style-type: none"><li>Low capital cost for a relatively small excavation and materials</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Capital costs can be marginally reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required trench volume)</li></ul> | <ul style="list-style-type: none"><li>Low capital cost relative to other alternatives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Costs may vary depending on extents and types of plantings</li></ul>                             |  |
| Maintenance and operating costs         | <ul style="list-style-type: none"><li>Low maintenance cost associated with cleaning out the trench</li><li>Lower maintenance frequency; likely once per year</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Maintenance frequency should be as directed by operations manual</li></ul>                             | <ul style="list-style-type: none"><li>Low maintenance costs with native, sustainable plantings</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Lower maintenance plants will minimize costs of maintenance and/or replanting</li></ul> |  |
| Impact on future development and growth | N/A                                                                                                                                                                                                                                                                                                                                                                     | N/A                                                                                                                                                                                                                                                                                        |  |
| Summary / Recommendations               | <ul style="list-style-type: none"><li>A cooling trench is a cost effective alternative to meet temperature criteria</li></ul>                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>Plantings at SWM facilities are a low cost alternative for providing temperature control</li></ul>                                                                                                                                                   |  |
| Results of Alternative Evaluation       | <ul style="list-style-type: none"><li>This alternative is not preferred because a wet pond is not a preferred option for this site</li></ul>                                                                                                                                                                                                                            | <ul style="list-style-type: none"><li>This alternative is not preferred because a wet pond is not a preferred option for this site</li></ul>                                                                                                                                               |  |

| Table 1 –Evaluation of Conceptual Design Alternatives for Uncontrolled Outlet #176 (Uncontrolled Area) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|--------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Criteria                                                                                               | Alternatives for Uncontrolled Outlet #176                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                        | Do Nothing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Oil-Grit Separators (OGS)                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Construct Water Quality Facility                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Alternative Description                                                                                | <ul style="list-style-type: none"><li>Stormwater runoff from the 15.94 ha minor drainage area will continue to be released into the receiving watercourse uncontrolled</li></ul>                                                                                                                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"><li>One (1) unit connected to the minor system prior to final control and outfall</li></ul>                                                                                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"><li>Loss of current land use including clearing of vegetation</li><li>Significant earthworks operations</li><li>Remove and replace section of sewer and outlet infrastructure</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Location in Treatment Train                                                                            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | End of Pipe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Target SWM Objective(s)                                                                                | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Quality Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Technical Considerations                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Constructability and accessibility                                                                     | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>Locations are accessible as OGS units could be installed upstream of the outfalls at manholes within municipal roadways; construction area is relatively small</li><li>Construction considerations include traffic interruptions and short term road closures</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Traffic management plans may reduce inconveniences associated with construction</li></ul> | <ul style="list-style-type: none"><li>Assess to the site is feasible; some complexity with slopes leading down to proposed facility area</li><li>Redirection of servicing will be required to outlet to constructed quality control</li><li>Existing changes in elevation could be incorporated as pond berms</li><li>The adjacent soccer field would need to be acquired and major earthworks undertaken to create the space required for the recommended safe grading slopes in a water quality facility</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Acquiring easements or property acquisition of adjacent private property may be required to achieve allowable side slopes in the pond</li></ul> |
| Ability to meet stormwater management objective(s)                                                     | <ul style="list-style-type: none"><li>Does not provide for or meet the stormwater management objectives of the City and/or TRCA, for water quality, erosion or quantity control</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul>                                                                                                                                                                                                                   | <ul style="list-style-type: none"><li>OGS units may be able to provide all required stormwater quality objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Pre-treatment of stormwater runoff with LIDs will enhance the performance of the OGS</li><li>Additional units may be designed to provide increased quality control if required</li></ul>                                                                                    | <ul style="list-style-type: none"><li>A wet pond facility would be capable of fully meeting the requirements for quality control</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>A wet pond facility for quality control can be further enhanced by adding storage volume for quantity control to achieve stormwater objectives</li><li>Quality control can be enhanced with LIDs that infiltrate runoff within the drainage area</li></ul>                                                                                                                                                                                                                                                                |
| Engineering best practises / innovative solution                                                       | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>OGS and similar units are noted as best management practices</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Pre-treatment of stormwater runoff with LIDs will enhance the performance of the OGS</li><li>Filtration cartridge options may be used rather than traditional OGS to target more specific pollutants</li></ul>                                                                             | <ul style="list-style-type: none"><li>Typically more traditional SWM approach</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Quality control can be enhanced with LIDs that infiltrate runoff within the drainage area</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Summary / Recommendations                                                                              | <ul style="list-style-type: none"><li>Does not provide for or meet the stormwater management objectives of the City and/or TRCA, for water quality, erosion or quantity control</li></ul>                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>OGS can be effective, low-space option to provide water quality control</li></ul>                                                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>Technically feasible, but requires significant earthworks</li><li>Construction of a surface detention facility can fully meet the quality control SWM criteria</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Natural Environment                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Impacts to wildlife and vegetation habitats                                                            | <ul style="list-style-type: none"><li>The current condition of wildlife and vegetation habitats will not change; however if the release of uncontrolled stormwater into the receiving watercourse causes future erosion in the watercourse or impacts the quality of the water in the watercourse, this could have a negative impact on the future condition of wildlife and vegetation habitats.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul> | <ul style="list-style-type: none"><li>OGS does not physically interfere with the existing outlet or impact the surrounding forested area and improves water quality prior to discharge to the watercourse</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation required</li></ul>                                                                                                                                                    | <ul style="list-style-type: none"><li>Existing vegetation will be cleared including the cultural meadow and possibly adult trees</li><li>Results in a loss of terrestrial habitat</li><li>There are opportunities to improve the habitat quality of the receiving watercourse by reducing the sediment loading and potential contaminate exposure of the receiving watercourse</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Restoration plans will be developed to restore the surrounding areas impacted by construction</li><li>Riparian and aquatic vegetation can be planted on the berms and within the wet pond facility</li></ul>                                                                |
| Impacts / improvements based on SAR / ESA                                                              | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>Meeting water quality criteria will improve water quality of downstream receiving waters</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Use of OGS can be enhanced with pre-treatment using LIDs throughout minor system watershed</li></ul>                                                                                                                                                           | <ul style="list-style-type: none"><li>There are opportunities to improve the habitat quality of the receiving watercourse by reducing the sediment loading of the watercourse</li><li>The receiving watercourse has been identified as unlikely to be Redside Dace habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li><li>Stringent construction practices can be implemented to reduce the possibility of</li></ul>                                                                                                                                                           |

| Criteria                                                                    | Alternatives for Uncontrolled Outlet #176                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                             | Do Nothing                                                                                                                                                                                                                        | Oil-Grit Separators (OGS)                                                                                                                                                                                                                                                                                                                                                                                                                              | Construct Water Quality Facility                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                                                                             |                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                        | introducing invasive species to the ecosystem during construction                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>Existing vegetation and forest adjacent to uncontrolled outlet provides terrestrial habitat and will remain in the current condition</li></ul>                                              | <ul style="list-style-type: none"><li>OGS offers improvements to water quality</li><li>Used in conjunction with LIDs, OGS can improve water conditions for SAR</li></ul>                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>A wet pond can be beneficial to downstream receiving waters but will alter any existing habitat within the construction area</li><li>Trees may be lost during construction</li></ul>                                                                                                                                                                                                                                                                                                                                             |
| Social Impacts                                                              |                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Requirement of easements or purchase of private lands                       | N/A                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>Likely not required; preference to install and maintain OGS within municipal R.O.W., where maintenance is easily accessible</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                                                                                                                                         | <ul style="list-style-type: none"><li>Likely required for the construction and maintenance of a SWM facility for UC #176</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Land requirements would be confirmed through conceptual design</li></ul>                                                                                                                                                                                                                                                                  |
| Impacts to public and private properties due to construction and operations | N/A                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>Roadway interference and/or short-term closure would be expected for the installation of OGS units</li><li>Temporary interference to be expected on roadways during maintenance (approximately once a year)</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Traffic management plans may reduce inconveniences associated with construction</li></ul>        | <ul style="list-style-type: none"><li>Noise and visual impacts associated with construction for the residences backing onto proposed SWM facility block</li><li>The nearby public park would be marginally reduced in size to create the required space to construct a water quality facility</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Construction management plan, including restrictions on hours</li><li>After construction is completed, the soccer field could be reconfigured and restored</li></ul> |
| Effect on public safety                                                     | N/A                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>Installed OGS does not pose threats to public safety</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>No mitigation undertaken</li></ul>                                                                                                                                                                                                                      | <ul style="list-style-type: none"><li>By building to the required side slope and depth criteria, the wet pond facility should not pose a threat to public safety</li><li>There are no trails though this green space and public access is very limited, thereby reducing the exposure of public to the facility</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Flattened slopes, warning signs, and fencing (if required) can provide measures of safety</li></ul>                                                |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>The ‘Do Nothing’ alternative has no social impacts</li></ul>                                                                                                                                | <ul style="list-style-type: none"><li>OGS presents few and short-term impacts associated with installation and maintenance</li></ul>                                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"><li>Construction of a wet pond facility would be a longer-term construction project with potential noise, traffic and visual impacts</li><li>A portion of the nearby public park will be affected during construction</li></ul>                                                                                                                                                                                                                                                                                                      |
| Economic Considerations                                                     |                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Capital costs                                                               | <ul style="list-style-type: none"><li>No action may result in greater capital expenses in the future</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul> | <ul style="list-style-type: none"><li>Relatively low capital cost for installation of one (1) unit and associated infrastructure works; cost will increase if more than one unit is required for the drainage area</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Capital cost of OGS units can be reduced if stormwater is pre-treated with LIDs (thus scaling down required OGS size)</li></ul> | <ul style="list-style-type: none"><li>High capital cost for earthworks, grading, infrastructure components and permits</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Capital costs can be marginally reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required quality control volumes and footprint)</li></ul>                                                                                                                                                        |
| Maintenance and operating costs                                             | N/A                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>Fairly low maintenance cost and frequency; approximately annually</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Maintenance frequency of OGS units should not decrease with increased pre-treatment</li></ul>                                                                                                                                              | <ul style="list-style-type: none"><li>Moderate maintenance cost and frequency; likely seasonally</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Maintenance frequency should be as directed by operations manual</li><li>Maintenance frequency can be reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required quality control volume)</li></ul>                                                                                                                       |
| Impact on future development and growth                                     | N/A                                                                                                                                                                                                                               | <ul style="list-style-type: none"><li>Size of OGS is static once installed and would require upgrading if a larger drainage area is directed to it (in order to meet water quality criteria)</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Additional OGS units may be installed in the future to correspond with growth</li></ul>                                                               | <ul style="list-style-type: none"><li>No impact, but detention facility would require expansion if contributing land use was to intensify</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>On-site control requirements for any intensified development within the facility’s watershed would mitigate further expansion</li></ul>                                                                                                                                                                                  |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>‘Do nothing’ may postpone required works and increase future costs</li></ul>                                                                                                                | <ul style="list-style-type: none"><li>Installation of OGS units is a low to medium cost solution for achievement of most of the required SWM criteria</li></ul>                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"><li>Construction of a wet pond facility would present high capital costs for achievement of quality control</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                |
| Results of Alternative Evaluation                                           | <ul style="list-style-type: none"><li>This alternative is not preferred because the alternative does not meet the stormwater management objectives</li></ul>                                                                      | <ul style="list-style-type: none"><li>This is a preferred alternative due to the lower cost, small disturbance area and ability to provide full quality control</li><li>This alternative can be implemented with little to no loss of existing trees.</li></ul>                                                                                                                                                                                        | <ul style="list-style-type: none"><li>This alternative is not preferred because major earthworks would be required to provide adequate space for a water quality facility. This makes this alternative costly and a greater construction undertaking with potentially more impacts to the public.</li></ul>                                                                                                                                                                                                                                                            |

| Criteria                                           | Alternatives for Uncontrolled Outlet #176                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |
|----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
|                                                    | Underground Storage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Construct Extended Detention Facility                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
| Alternative Description                            | <ul style="list-style-type: none"><li>Installed at proposed pond block location</li><li>Underground storage tanks will capture and detain stormwater and release over an extended time period</li><li>Infiltration type underground tanks will allow for infiltration during detention period</li><li>May need water quality control prior to infiltrating (if proposed)</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"><li>Loss of current land use including clearing of vegetation</li><li>Significant earthworks</li><li>Remove and replace section of existing sewer and outlet infrastructure</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |
| Location in Treatment Train                        | End of Pipe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |
| Target SWM Objectives                              | Erosion Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |
| Technical Considerations                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |
| Constructability and accessibility                 | <ul style="list-style-type: none"><li>Footprint may be large but is constructible within municipally owned lands; constructability is moderate</li><li>Still allows for use of land at-grade</li><li>May require re-organization of existing outlets to feed into central underground tanks</li><li>Based on soil mapping, the majority of the drainage area is not ideal for infiltration. Only the eastern section of the drainage area and the proposed underground tank area is conducive for infiltration</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Tanks with infiltration capabilities provide additional benefits to erosion</li><li>Site specific soil testing is required to confirm suitability of infiltration</li></ul> | <ul style="list-style-type: none"><li>Assess to the site is feasible; some complexity with slopes leading down to proposed facility area</li><li>Redirection of servicing will be required to outlet to constructed quality control</li><li>Existing changes in elevation could be incorporated as pond berms</li><li>The adjacent soccer field to the site may need to be acquired for the construction of an extended detention facility to utilize the existing gradient and the location of the staging area</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Acquiring easements or property acquisition of adjacent private property may be required to achieve allowable side slopes in the pond</li></ul> |  |
| Ability to meet stormwater management objective(s) | <ul style="list-style-type: none"><li>Underground tanks, especially with infiltration capabilities, are effective for providing quantity, quality and erosion control</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Longer detention times can enhance the erosion control</li><li>Infiltration type underground tanks will allow for infiltration during detention period</li><li>May need water quality control prior to infiltrating (if proposed)</li></ul>                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"><li>An extended detention facility would be capable of fully meeting the requirements for erosion control detention</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>An extended detention facility could be enhanced with the addition of quality and /or quantity controls</li><li>Erosion control can be enhanced with LIDs that detain and/or infiltrate runoff within the drainage area</li></ul>                                                                                                                                                                                                                                                                          |  |
| Engineering best practises / innovative solution   | <ul style="list-style-type: none"><li>Underground tanks, including infiltration, are noted as best management practices</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Maintenance of underground tanks is more extensive than at-grade alternatives</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"><li>Typically more traditional SWM approach</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Erosion control can be enhanced with LIDs that detain and/or infiltrate runoff within the drainage area</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Summary / Recommendations                          | <ul style="list-style-type: none"><li>Technically feasible, requiring more intrusive maintenance</li><li>Useful for maintaining land uses at-grade and visually not intrusive</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"><li>Technically feasible, but requires significant earthworks</li><li>Construction of a extended detention facility can fully meet the erosion control SWM criteria</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |
| Natural Environment                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |
| Impacts to wildlife and vegetation habitats        | <ul style="list-style-type: none"><li>May require removal of some vegetation depending on specific location</li><li>Once installed, less intrusive than other alternatives because of location below grade</li><li>TRCA policy does not allow construction of new facilities within the Valleylands.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Restoration plan required if loss of vegetation expected due to construction</li></ul>                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>Existing vegetation will be cleared including the cultural meadow and possibly adult trees</li><li>Results in a loss of terrestrial habitat</li><li>There are opportunities to improve the habitat quality of the receiving watercourse by reducing the peak flows entering the watercourse and thereby reducing erosion</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Restoration plans will be developed to restore the surrounding areas impacted by construction</li><li>Vegetation can be planted on the berms of the extended detention facility</li></ul>                                                                                                         |  |
| Impacts / improvements based on SAR / ESA          | <ul style="list-style-type: none"><li>Underground tanks may improve the habitat quality of the receiving watercourse by reducing the erosion and thereby sediment loading of the receiving watercourse</li><li>The receiving watercourse has been identified as unlikely to be Redside Dace habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li><li>Stringent construction practices can be</li></ul>                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>There are opportunities to improve the habitat quality of the receiving watercourse by reducing the erosion and thereby sediment loading of the receiving watercourse</li><li>The receiving watercourse has been identified as unlikely to be Redside Dace habitat</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Further consultation with the MNR regarding additional SAR will occur prior to the detailed design of the retrofit</li><li>Stringent construction practices can be implemented to reduce the possibility of</li></ul>                                                                                                                                   |  |



| Criteria                                                                    | Alternatives for Uncontrolled Outlet #176                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |
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|                                                                             | Underground Storage                                                                                                                                                                                                                                                                                                                                                                                                                                               | Construct Extended Detention Facility                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |
|                                                                             | implemented to reduce the possibility of introducing invasive species to the ecosystem during construction                                                                                                                                                                                                                                                                                                                                                        | introducing invasive species to the ecosystem during construction                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>Underground tanks are a long-term non-invasive alternative for providing erosion control</li><li>TRCA policy does not allow construction of new facilities within the Valleylands.</li></ul>                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>A extended detention facility can be beneficial to downstream receiving waters but will alter any existing habitat within the construction area</li><li>Tree loss is probable for the construction of an extended detention facility</li></ul>                                                                                                                                                                                                                               |  |
| Social Impacts                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |
| Requirement of easements or purchase of private lands                       | <ul style="list-style-type: none"><li>May be required for the construction and maintenance of an underground storage tank facility for UC #176</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Land requirements would be confirmed through conceptual design; acquisition of additional land less likely than that required for an at-grade facility</li></ul>                                               | <ul style="list-style-type: none"><li>May be required for the construction and maintenance of a SWM facility for UC #176</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Land requirements would be confirmed through conceptual design</li></ul>                                                                                                                                                                                                              |  |
| Impacts to public and private properties due to construction and operations | <ul style="list-style-type: none"><li>Noise and visual impacts associated with construction for the residences backing onto proposed SWM facility block</li><li>A construction staging area may need to be established within the existing soccer field / park area</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Construction management plan, including restrictions on hours, required fencing</li></ul> | <ul style="list-style-type: none"><li>Noise and visual impacts associated with construction for the residences backing onto proposed SWM facility block</li><li>A construction staging area may need to be established within the existing soccer field / park area</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Construction management plan, including restrictions on hours, required fencing</li></ul>                                                  |  |
| Effect on public safety                                                     | <ul style="list-style-type: none"><li>No public safety concerns beyond construction period</li><li>There are no trails though this green space so public access is very limited, reducing the exposure of public to the facility</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Proper signage and safety measures to be set up for construction period</li></ul>                                            | <ul style="list-style-type: none"><li>By building to the required slope and depth criteria, the extended detention facility should not pose a threat to public safety</li><li>There are no trails though this green space so public access is very limited, reducing the exposure of public to the facility</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Adequate slopes, warning signs, and fencing (if required) can provide measures of safety</li></ul> |  |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>Underground tanks are proposed to be located in within municipal lands; not intrusive to the public after construction</li></ul>                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"><li>Construction of an extended detention facility would be a longer-term construction project with potential noise, traffic and visual impacts</li></ul>                                                                                                                                                                                                                                                                                                                        |  |
| Economic Considerations                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |
| Capital costs                                                               | <ul style="list-style-type: none"><li>Moderate capital cost related to storage tank infrastructure</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Efficient tank design to minimize capital costs</li></ul>                                                                                                                                                                                                  | <ul style="list-style-type: none"><li>Moderate to high capital cost for earthworks, grading, infrastructure components, permits</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Capital costs can be marginally reduced if stormwater is pre-treated with LIDs throughout the watershed (thus scaling down required detention volumes)</li></ul>                                                                                                               |  |
| Maintenance and operating costs                                             | <ul style="list-style-type: none"><li>Low maintenance costs associated with cleaning out tanks as per operations manual or in event of clogging</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Can prevent clogging with additional pre-treatment techniques</li></ul>                                                                                                                                       | <ul style="list-style-type: none"><li>Lower maintenance cost and frequency; likely every few years</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Maintenance frequency should be as directed by operations manual</li><li>Maintenance frequency can be reduced by providing pre-treatment for sediment removal</li></ul>                                                                                                                                     |  |
| Impact on future development and growth                                     | <ul style="list-style-type: none"><li>No impact, but underground tanks would require expansion if contributing land use was to intensify</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>On-site control requirements for any future intensification within the watershed would mitigate further expansion</li></ul>                                                                                          | <ul style="list-style-type: none"><li>No impact, but extended detention facility would require expansion if contributing land use was to intensify</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>On-site control requirements for any intensified development within the facility's watershed would mitigate further expansion</li></ul>                                                                                                                     |  |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>Underground tanks provide moderate capital and maintenance costs for the achievement of quantity, quality and erosion control</li><li>A larger footprint may be required with the use of this alternative, though at-grade land use would not be changed</li></ul>                                                                                                                                                          | <ul style="list-style-type: none"><li>Construction of an extended detention facility would present moderate to high capital costs for achievement of quantity control</li></ul>                                                                                                                                                                                                                                                                                                                                    |  |
| Results of Alternative Evaluation                                           | <ul style="list-style-type: none"><li>This alternative is not preferred because in accordance with TRCA policy, a new facility cannot be constructed within the Valleylands.</li></ul>                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"><li>This alternative is not preferred because major earthworks would be required to provide adequate space for an extended detention facility. This makes this alternative costly and a greater construction undertaking with potentially more impacts to the public.</li></ul>                                                                                                                                                                                                  |  |

| Criteria                                                                    | Alternatives for Uncontrolled Outlet #176                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |
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|                                                                             | Bioswales                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Infiltration in Right-of-Ways (R.O.W.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |
| Alternative Description                                                     | <ul style="list-style-type: none"><li>Construct bioswales within the road right-of-ways within the facility drainage area</li><li>Bioswales to contain native plantings and subdrains</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>Install perforated secondary pipe within existing storm sewer systems to allow for infiltration through linear soakaway pits</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
| Location in Treatment Train                                                 | Conveyance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |
| Target SWM Objective(s)                                                     | Quality and Erosion Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |
| Technical Considerations                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |
| Constructability and accessibility                                          | <ul style="list-style-type: none"><li>Construction area is extensive and pipe networks are more intricate, requiring coordination with existing infrastructure</li><li>Road right of ways need to be conducive to grading and space criteria for bioswales</li><li>Based on soil mapping, the majority of the drainage area is not ideal for infiltration. Only the eastern section of the drainage area and the pond block is conducive for infiltration</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Bioswales may be more suited as supplementary water quality / erosion control measures, where constructability and retrofit are least disruptive to existing infrastructure</li><li>Site specific soil testing is required to confirm soil suitability of infiltration</li></ul> | <ul style="list-style-type: none"><li>Construction area is extensive and many secondary infiltration pipes would require to be installed to achieve SWM criteria</li><li>Requires coordination with existing infrastructure and utilities</li><li>Based on soil mapping, the majority of the drainage area is not ideal for infiltration. Only the eastern section of the drainage area and the pond block is conducive for infiltration</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may be more suited as supplementary water quality / erosion control measures, where constructability and retrofit are least disruptive to existing infrastructure</li><li>Site specific soil testing is required to confirm soil suitability of infiltration</li></ul> |  |
| Ability to meet stormwater management objective(s)                          | <ul style="list-style-type: none"><li>Bioswales are more effective when used within a treatment train to achieve the stormwater objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Additional pre-treatment will enhance the function of bioswales, to reduce clogging of the underdrain pipes</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may are more effective when used within a treatment train to achieve the stormwater objectives</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Additional pre-treatment will enhance the function of the perforated pipes, to reduce clogging</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |
| Engineering best practises / innovative solution                            | <ul style="list-style-type: none"><li>Bioswales are innovative solutions within stormwater management conveyance systems</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Enhanced with further use of LIDs such as vegetated filter strips</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may are innovative solutions within stormwater management</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Enhanced with further use of LIDs such as vegetated filter strips</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>Bioswales are effective as part of a treatment train and where retrofit does not greatly interfere with existing infrastructure</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits may are effective as part of a treatment train and where retrofit does not greatly interfere with existing infrastructure</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |
| Natural Environment                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |
| Impacts to wildlife and vegetation habitats                                 | <ul style="list-style-type: none"><li>May require removal of some vegetation depending on specific location</li><li>May present phosphorus issues if not properly designed and/or maintained</li><li>Bioswales may decrease water temperature, providing benefits to the aquatic habitat of the receiving watercourse</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Planted bioswales will enhance neighbourhoods with additional vegetated areas</li></ul>                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"><li>May require removal of some vegetation depending on specific location; likely few impacts to existing wildlife and vegetation habitats</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Areas disturbed during construction will be restored.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |
| Impacts / improvements based on SAR / ESA                                   | <ul style="list-style-type: none"><li>N/A</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"><li>N/A</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |
| Summary / Recommendations                                                   | <ul style="list-style-type: none"><li>Bioswales that are properly designed to avoid phosphorus loading provide positive impact on the natural environment</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"><li>Perforated pipes (exfiltration pipes) and soakaway pits present few impact on the natural environment</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |
| Social Impacts                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |
| Requirement of easements or purchase of private lands                       | <ul style="list-style-type: none"><li>To be constructed within municipal R.O.W.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"><li>To be constructed within municipal R.O.W.</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Not applicable</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
| Impacts to public and private properties due to construction and operations | <ul style="list-style-type: none"><li>Impacts may include temporary, minor traffic and noise issues and significant visual nuisances due to construction within the residential streets</li><li>Bioswales are likely to face public opposition due to the maintenance requirements, visual disruption to an otherwise “clean” front lawn</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"><li>Impacts may include temporary, minor traffic and noise issues due to construction within the residential streets</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>Appropriate construction and traffic management schedule to be adhered to</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |

| Criteria                                | Alternatives for Uncontrolled Outlet #176                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
|                                         | Bioswales                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Infiltration in Right-of-Ways (R.O.W.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |
|                                         | and inconvenience of culverts under driveways<br><b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Appropriate construction and traffic management schedule to be adhered to</li></ul>                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
| Effect on public safety                 | <ul style="list-style-type: none"><li>▪ No public safety concerns beyond construction period</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Proper signage and safety measures to be set up for construction period</li></ul>                                                                                                                                                                                                             | <ul style="list-style-type: none"><li>▪ No public safety concerns beyond construction period</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Proper signage and safety measures to be set up for construction period</li></ul>                                                                                                                                                                                                                                           |  |
| Summary / Recommendations               | <ul style="list-style-type: none"><li>▪ Impacts during construction are temporary and mostly minor</li><li>▪ Long term impacts on residents due to visual impacts and culvert maintenance are significant</li></ul>                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"><li>▪ Impacts are minor and mostly temporary, within the construction period</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                       |  |
| Economic Considerations                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
| Capital costs                           | <ul style="list-style-type: none"><li>▪ Moderate to high capital cost related to new pipe infrastructure, earthworks and plantings, as well as likely relocation of existing pipe infrastructure</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Proficient SUE investigation prior to design work can minimize unexpected existing pipe/utility interferences</li></ul>                                                                   | <ul style="list-style-type: none"><li>▪ Moderate to high capital cost related to new pipe infrastructure, earthworks and plantings, as well as likely relocation of existing pipe infrastructure</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Proficient SUE investigation prior to design work can minimize unexpected existing pipe/utility interferences</li></ul>                                                                                                 |  |
| Maintenance and operating costs         | <ul style="list-style-type: none"><li>▪ Low to moderate maintenance costs associated with replacing filter media, unclogging perforated pipes</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Pre-treatment of stormwater with grassed filter strips can prevent some clogging of perforated pipes</li></ul>                                                                                                                               | <ul style="list-style-type: none"><li>▪ Low to moderate maintenance costs associated with unclogging perforated pipes</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ Pre-treatment of stormwater with grassed filter strips can prevent some clogging of perforated pipes</li></ul>                                                                                                                                                                                     |  |
| Impact on future development and growth | <ul style="list-style-type: none"><li>▪ Retrofit R.O.W. with bioswales may dictate R.O.W. standards for future development</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ On-site control requirements for any future intensification within the watershed would mitigate negative impacts on the LID</li></ul>                                                                                                                           | <ul style="list-style-type: none"><li>▪ Retrofit R.O.W. with perforated pipes and soakaway pits may dictate R.O.W. standards for future development</li></ul> <b>Mitigation/Compensation/Enhancement Measures</b> <ul style="list-style-type: none"><li>▪ On-site control requirements for any future intensification within the watershed would mitigate negative impacts on the LID</li></ul>                                                                                                                                |  |
| Summary / Recommendations               | <ul style="list-style-type: none"><li>▪ Bioswales are a moderate to high capital cost for retrofit but may add value to a neighbourhood</li></ul>                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>▪ Perforated pipes and soakaway pits are a moderate to high capital cost for retrofit</li><li>▪ Due to the poor infiltration in the drainage area, Infiltration in the R.O.W. is not a recommended option</li></ul>                                                                                                                                                                                                                                                                      |  |
| Results of Alternative Evaluation       | <ul style="list-style-type: none"><li>▪ This alternative is not preferred because bioswales cannot provide the required level of water quality and erosion control.</li><li>▪ Another alternative would need to be implemented in conjunction with bioswales in order to meet SWM objectives, making this alternative economically inefficient.</li><li>▪ The construction and maintenance of bioswales will create short and long term accessibility and visual impacts on residents.</li></ul> | <ul style="list-style-type: none"><li>▪ This alternative is not preferred because infiltration in R.O.W.s cannot provide the required level of water quality and erosion control.</li><li>▪ Another alternative would need to be implemented in conjunction with infiltration in R.O.W.s in order to meet SWM objectives, making this alternative economically inefficient.</li><li>▪ The construction of infiltration pipes in R.O.W.s will create short term accessibility, visual and noise impacts on residents.</li></ul> |  |