

# **CITY OF MARKHAM - WATER SAMPLING PROGRAM**

*January 1 to December 31, 2017*

To comply with the Ontario Drinking Water System Regulation, Markham collects and tests water samples throughout its distribution system at a total of 106 locations. The 106 sample locations are strategically selected and evenly distributed to ensure Markham gets the best representation of the water distribution system. The need for additional locations is reviewed annually & in 2017, no additional locations were warranted. Sampling is rotated through the 106 locations and the drinking water is tested for Chlorine residual, Bacteria, Trihalomethanes, Nitrites & Nitrates, Lead, Organics & Inorganics in compliance with Ontario Regulation 170/03. The samples are collected by licensed Waterworks operators and analyzed by the provincially approved York-Durham Regional Environmental Laboratory.

Waterworks follows rigorous testing and compliance procedures. The City reports any adverse sampling results that occur to the York Region Medical Officer of Health and to the Ministry of Environment and Climate Change (MOECC) and immediately undertakes the necessary corrective action. Re-samples are taken following the corrective action(s) and tested until two consecutive samples are within acceptable parameters.

## **Summary of the sampling for 2017 follows:**

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### **Sampling Program:**

Total Number of Samples collected and tested in 2017= 6,292

### **Adverse Test Results:**

Total Number of Adverse Water Quality Incidents (AWQI) = 16

### **Breakdown of Adverse Results:**

Total adverse due to Microbiology Exceedances = 14

Total adverse due to low Chlorine Residual = 2

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The drinking water distributed to the City of Markham residents in 2017 was safe to drink and met all drinking water requirements. During the operation of the water distribution system during 2017, there were very few adverse sample incidents (0.25% of all system tests undertaken) and when these occurred, they were immediately resolved. The drinking water system is maintained by Waterworks with continual improvements and programs in place to ensure water of the highest quality.



**ANNUAL REPORT**

|  |  |
|--|--|
| <b>Drinking-Water System Number:</b>   | 220004162                              |
| <b>Drinking-Water System Name:</b>     | Markham Distribution System            |
| <b>Drinking-Water System Owner:</b>    | The Corporation of the City of Markham |
| <b>Drinking-Water System Category:</b> | Large Municipal Residential System     |
| <b>Period being reported:</b>          | January 1, 2017 to December 31, 2017   |

|  |   |
|--|---|
| <p><b><u>Complete if your Category is Large Municipal Residential or Small Municipal Residential</u></b></p> <p>Does your Drinking-Water System serve more than 10,000 people? Yes [ <input checked="" type="checkbox"/> ] No [ <input type="checkbox"/> ]</p> <p>Is your annual report available to the public at no charge on a web site on the Internet? Yes [ <input checked="" type="checkbox"/> ] No [ <input type="checkbox"/> ]</p> <p>Location where Summary Report required under O. Reg. 170/03 Schedule 22 will be available for inspection.</p> <div style="border: 1px solid black; padding: 5px;"> <ul style="list-style-type: none"> <li><a href="http://www.markham.ca">www.markham.ca</a></li> <li>8100 Warden Ave. – Waterworks Department</li> <li>Markham Civic Centre – 101 Town Centre Blvd. – Contact Centre</li> </ul> </div> | <p><b><u>Complete for all other Categories.</u></b></p> <p>Number of Designated Facilities served:</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin-left: 20px;">Not applicable</div> <p>Did you provide a copy of your annual report to all Designated Facilities you serve? Yes [ <input type="checkbox"/> ] No [ <input type="checkbox"/> ]</p> <p>Number of Interested Authorities you report to:</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin-left: 20px;">Not applicable</div> <p>Did you provide a copy of your annual report to all Interested Authorities you report to for each Designated Facility? Yes [ <input type="checkbox"/> ] No [ <input type="checkbox"/> ]</p> |
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**Note: For the following tables below, additional rows or columns may be added or an appendix may be attached to the report**

List all Drinking-Water Systems (if any), which receive all of their drinking water from your system:

| Drinking Water System Name | Drinking Water System Number |
|----------------------------|------------------------------|
| Not applicable             |                              |

Did you provide a copy of your annual report to all Drinking-Water System owners that are connected to you and to whom you provide all of its drinking water?  
Yes [  ] No [  ]



Indicate how you notified system users that your annual report is available, and is free of charge.

- Public access/notice via the web
- Public access/notice via Government Office
- Public access/notice via a newspaper
- Public access/notice via Public Request
- Public access/notice via a Public Library
- Public access/notice via other method \_\_\_\_\_

**Describe your Drinking-Water System**

The City of Markham’s distribution system is an extension of the Toronto and York Region distribution systems. Raw surface water from Lake Ontario is disinfected, treated and tested rigorously by the City of Toronto and Peel Region for microbiological, organic and inorganic parameters prior to reaching the York Region distribution system. Markham is supplied with treated water via feeder mains from Toronto and Peel Region. York Region distribution system acts as a wholesale supplier of water and provides further testing, storage and pressure boosting for the Markham system.

Markham’s Distribution System provides treated water to approximately 356,720 residents and is comprised of approximately 1,100 kilometers of various size watermains, 11,106 watermain valves and 8,682 municipal fire hydrants. Markham is a distribution only system, without pumping and storage facilities. Markham’s drinking water within the distribution system is tested for standard parameters, in compliance with Ontario Regulation 170/03. The samples are collected by licensed Waterworks operators and analyzed by the provincially approved York-Durham Regional Environmental Laboratory.

**List all water treatment chemicals used over this reporting period**

Not applicable; treatment chemicals are introduced at various sources by the City of Toronto, Peel Region and York Region only.

**Were any significant expenses incurred to?**

- Install required equipment
- Repair required equipment
- Replace required equipment

**Please provide a brief description and a breakdown of monetary expenses incurred**

|   |                    |
|---|--------------------|
| <b>Cathodic Protection of Iron Watermains</b> | <b>= \$448,480</b> |
| <b>Water Meter Replacement/Upgrades</b>       | <b>= \$649,585</b> |
| <b>Watermain Replacement</b>                  | <b>= \$732,629</b> |
| <b>Watermain Replacement Design for 2017</b>  | <b>= \$145,082</b> |



**Provide details on the notices submitted in accordance with subsection 18(1) of the Safe Drinking-Water Act or section 16-4 of Schedule 16 of O.Reg.170/03 and reported to Spills Action Centre**

| <b>Incident Date</b>                        | <b>Parameter</b>         | <b>Result</b>   | <b>Unit of Measure</b> | <b>Corrective Action</b>        | <b>Corrective Action Date</b> |
|---|--------------------------|-----------------|------------------------|---------------------------------|-------------------------------|
| <b>June 20, 2017<br/>(AWQI #133444)</b>     | <b>Total Coliform</b>    | <b>P</b>        | <b>P/A</b>             | <b>Flush Mains and Resample</b> | <b>June 20, 2017</b>          |
| <b>July 5, 2017<br/>(AWQI #133817)</b>      | <b>Total Coliform</b>    | <b>P</b>        | <b>P/A</b>             | <b>Flush Mains and Resample</b> | <b>July 5, 2017</b>           |
| <b>July 7, 2017<br/>(AWQI #133869)</b>      | <b>Total Coliform</b>    | <b>6</b>        | <b>CFU/m L</b>         | <b>Flush Mains and Resample</b> | <b>July 7, 2017</b>           |
| <b>July 7, 2017<br/>(AWQI #133890)</b>      | <b>Total Coliform</b>    | <b>31</b>       | <b>CFI/mL</b>          | <b>Flush Mains and Resample</b> | <b>July 7, 2017</b>           |
| <b>July 11, 2017<br/>(AWQI #133972)</b>     | <b>Total Coliform</b>    | <b>P</b>        | <b>P/A</b>             | <b>Flush Mains and Resample</b> | <b>July 11, 2017</b>          |
| <b>July 11, 2017<br/>(AWQI # 133975)</b>    | <b>Total Coliform</b>    | <b>P</b>        | <b>P/A</b>             | <b>Flush Mains and Resample</b> | <b>July 11, 2017</b>          |
| <b>July 18, 2017<br/>(AWQI #134251)</b>     | <b>Total Coliform</b>    | <b>P</b>        | <b>P/A</b>             | <b>Flush Mains and Resample</b> | <b>July 18, 2017</b>          |
| <b>July 25, 2017<br/>(AWQI #134529)</b>     | <b>Total Coliform</b>    | <b>P</b>        | <b>P/A</b>             | <b>Flush Mains and Resample</b> | <b>July 25, 2017</b>          |
| <b>July 25, 2017<br/>(AWQI #134534)</b>     | <b>Total Coliform</b>    | <b>P</b>        | <b>P/A</b>             | <b>Flush Mains and Resample</b> | <b>July 25, 2017</b>          |
| <b>July 26, 2017<br/>(AWQI #134623)</b>     | <b>Total Coliform</b>    | <b>9 and 1</b>  | <b>CFU/m L</b>         | <b>Flush Mains and Resample</b> | <b>July 26, 2017</b>          |
| <b>August 1, 2017<br/>(AWQI #134841)</b>    | <b>Total Coliform</b>    | <b>P</b>        | <b>P/A</b>             | <b>Flush Mains and Resample</b> | <b>August 1, 2017</b>         |
| <b>August 1, 2017<br/>(AWQI #134842)</b>    | <b>Total Coliform</b>    | <b>P</b>        | <b>P/A</b>             | <b>Flush Mains and Resample</b> | <b>August 1, 2017</b>         |
| <b>August 1, 2017<br/>(AWQI #134845)</b>    | <b>Total Coliform</b>    | <b>P</b>        | <b>P/A</b>             | <b>Flush Mains and Resample</b> | <b>August 1, 2017</b>         |
| <b>August 15, 2017<br/>(AWQI #135475)</b>   | <b>Total Coliform</b>    | <b>P</b>        | <b>P/A</b>             | <b>Flush Mains and Resample</b> | <b>August 15, 2017</b>        |
| <b>October 5, 2017<br/>(AWQI #137056)</b>   | <b>Combined Chlorine</b> | <b>&lt;0.25</b> | <b>mg/L</b>            | <b>Flush Mains and Resample</b> | <b>October 5, 2017</b>        |
| <b>November 20, 2017<br/>(AWQI #138121)</b> | <b>Combined Chlorine</b> | <b>&lt;0.25</b> | <b>mg/L</b>            | <b>Flush Mains and Resample</b> | <b>November 20, 2017</b>      |



**Microbiological testing done under the Schedule 10, 11 or 12 of Regulation 170/03, during this reporting period.**

|              | Number of Samples | Range of E.Coli Or Fecal Results (min #)-(max #) | Range of Total Coliform Results (min #)-(max #) | Number of HPC Samples | Range of HPC Results (min #)-(max #) |
|--------------|-------------------|--|---|-----------------------|--------------------------------------|
| Raw          | N/A               |  |   |                       |                                      |
| Treated      | N/A               |  |   |                       |                                      |
| Distribution | 1,836             | 0-0  | 0-9   | 610                   | 0-440                                |

**Operational testing done under Schedule 7, 8 or 9 of Regulation 170/03 during the period covered by this Annual Report.**

|   | Number of Grab Samples                    | Range of Results (min #)-(max #) |
|---|---|----------------------------------|
| Turbidity                                   |   |                                  |
| Chlorine                                    | 8,760 (Chlorine Analyzer)<br>4,334 (Grab) | Combined 0.00 - 1.98 mg/L        |
| Fluoride (If the DWS provides fluoridation) | *Next sampling is in January, 2020        |                                  |

*NOTE: For continuous monitors use 8760*

*NOTE: Record the unit of measure if it is not milligrams per litre.*

**Summary of additional testing and sampling carried out in accordance with the requirement of an approval, order or other legal instrument.**

| Date of legal instrument issued | Parameter | Date Sampled | Result | Unit of Measure |
|---------------------------------|-----------|--------------|--------|-----------------|
| N/A                             |           |              |        |                 |
|                                 |           |              |        |                 |

**Summary of Inorganic parameters tested during this reporting period or the most recent sample results**

| Parameter | Sample Date  | Result Value | Unit of Measure | Exceedance |
|-----------|--------------|--------------|-----------------|------------|
| Antimony  | May 03, 2017 | 0.0009       | mg/L            | No         |
| Arsenic   | May 03, 2017 | 0.0008       | mg/L            | No         |
| Barium    | May 03, 2017 | 0.0230       | mg/L            | No         |
| Boron     | May 03, 2017 | 0.120        | mg/L            | No         |
| Cadmium   | May 03, 2017 | <0.0005      | mg/L            | No         |



|          |                   |         |      |    |
|----------|-------------------|---------|------|----|
| Chromium | May 03, 2017      | 0.0021  | mg/L | No |
| *Lead    | See Summary Below |         |      |    |
| Mercury  | May 03, 2017      | <0.05   | ug/L | No |
| Selenium | May 03, 2017      | <0.0005 | mg/L | No |
| Sodium   | N/A               |         |      |    |
| Uranium  | May 03, 2017      | <0.0005 | mg/L | No |
| Fluoride | N/A               |         |      |    |
| Nitrite  | November 28, 2017 | <0.05   | mg/L | No |
| Nitrate  | November 28, 2017 | <0.50   | mg/L | No |

**\*Summary of Lead testing under Schedule 15.1 during this reporting period**

(applicable to the following drinking water systems; large municipal residential systems, small municipal residential systems, and non-municipal year-round residential systems)

| Location Type | Number of Samples | Range of Lead Results (min#) – (max #) | Number of Exceedances |
|---------------|-------------------|--|-----------------------|
| Plumbing      | 50                | <0.0005 mg/L – 0.0005 mg/L             | 0                     |
| Distribution  | 20                | <0.0005 mg/L – 0.0006 mg/L             | 0                     |

The City of Markham was granted reduced sampling for Lead Testing from plumbing servicing of private residences (20 per period), plumbing servicing non-residential buildings(5 per period) and distribution locations(10 per period). Reduced sampling was for the two periods of sampling, Dec, 15, 2016 to April 15, 2017 and June 15, 2017 to October 15, 2017.

**Summary of Organic parameters sampled during this reporting period or the most recent sample results**

| Parameter  | Sample Date  | Result Value | Unit of Measure | Exceedance |
|--|--------------|--------------|-----------------|------------|
| Alachlor   | May 03, 2017 | <0.4         | ug/L            | No         |
| Aldrin   | May 03, 2017 | <0.007       | ug/L            | No         |
| Dieldrin   | May 03, 2017 | <0.005       | ug/L            | No         |
| Atrazine + N-dealkylated metabolites                           | May 03, 2017 | <0.2         | ug/L            | No         |
| Azinphos-methyl  | May 03, 2017 | <0.3         | ug/L            | No         |
| Benzene  | May 03, 2017 | <0.1         | ug/L            | No         |
| Benzo(a)pyrene   | May 03, 2017 | <0.01        | ug/L            | No         |
| Bromoxynil   | May 03, 2017 | <0.4         | ug/L            | No         |
| Carbaryl   | May 03, 2017 | <3.0         | ug/L            | No         |
| Carbofuran   | May 03, 2017 | <3.0         | ug/L            | No         |
| Carbon Tetrachloride   | May 03, 2017 | <0.2         | ug/L            | No         |
| Chlorpyrifos   | May 03, 2017 | <0.2         | ug/L            | No         |
| Diazinon   | May 03, 2017 | <0.2         | ug/L            | No         |
| Dicamba  | May 03, 2017 | <0.4         | ug/L            | No         |
| 1,2-Dichlorobenzene  | May 03, 2017 | <0.1         | ug/L            | No         |
| 1,4-Dichlorobenzene  | May 03, 2017 | <0.1         | ug/L            | No         |
| 1,2-Dichloroethane   | May 03, 2017 | <0.1         | ug/L            | No         |
| 1,1-Dichloroethylene (vinylidene chloride)(1,1-dichloroethene) | May 03, 2017 | <0.3         | ug/L            | No         |



|   |                   |        |      |    |
|---|-------------------|--------|------|----|
| Dichloromethane                           | May 03, 2017      | <1.0   | ug/L | No |
| 2-4 Dichlorophenol                        | May 03, 2017      | <0.7   | ug/L | No |
| 2,4-Dichlorophenoxy acetic acid (2,4-D)   | May 03, 2017      | <0.8   | ug/L | No |
| Diclofop-methyl                           | May 03, 2017      | <0.4   | ug/L | No |
| Dimethoate                                | May 03, 2017      | <0.3   | ug/L | No |
| Diquat                                    | May 03, 2017      | <1.0   | ug/L | No |
| Diuron                                    | May 03, 2017      | <3.0   | ug/L | No |
| Glyphosate                                | May 03, 2017      | <25    | ug/L | No |
| Malathion                                 | May 03, 2017      | <0.2   | ug/L | No |
| Metolachlor                               | May 03, 2017      | <0.2   | ug/L | No |
| Metribuzin                                | May 03, 2017      | <0.3   | ug/L | No |
| Monochlorobenzene                         | May 03, 2017      | <0.1   | ug/L | No |
| Paraquat                                  | May 03, 2017      | <1.0   | ug/L | No |
| Pentachlorophenol                         | May 03, 2017      | <0.4   | ug/L | No |
| Phorate                                   | May 03, 2017      | <0.2   | ug/L | No |
| Picloram                                  | May 03, 2017      | <0.7   | ug/L | No |
| Polychlorinated Biphenyls(PCB)            | May 03, 2017      | <0.02  | ug/L | No |
| Prometryne                                | May 03, 2017      | <0.2   | ug/L | No |
| Simazine                                  | May 03, 2017      | <0.2   | ug/L | No |
| THM<br>(NOTE: show latest annual average) | Annual<br>Average | 10.03  | ug/L | No |
| Terbufos                                  | May 03, 2017      | <0.2   | ug/L | No |
| Tetrachloroethylene                       | May 03, 2017      | <0.3   | ug/L | No |
| 2,3,4,6-Tetrachlorophenol                 | May 03, 2017      | <0.5   | ug/L | No |
| Triallate                                 | May 03, 2017      | <4.0   | ug/L | No |
| Trichloroethylene                         | May 03, 2017      | <0.1   | ug/L | No |
| 2,4,6-Trichlorophenol                     | May 03, 2017      | <0.5   | ug/L | No |
| Trifluralin                               | May 03, 2017      | <0.006 | ug/L | No |
| Vinyl Chloride                            | May 03, 2017      | <0.2   | ug/L | No |
| MCPA                                      | May 03, 2017      | <5.0   | ug/L | No |

**List any Inorganic or Organic parameter(s) that exceeded half the standard prescribed in Schedule 2 of Ontario Drinking Water Quality Standards.**

| Parameter | Result Value | Unit of Measure | Date of Sample |
|-----------|--------------|-----------------|----------------|
| NONE      |              |                 |                |
|           |              |                 |                |