

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

*January 1 to December 31, 2016*

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 2016, 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 2016 follows:**

---

### **Sampling Program:**

Total Number of Samples collected and tested in 2016 = 6,389

### **Adverse Test Results:**

Total Number of Adverse Water Quality Incidents (AWQI) = 11

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

Total adverse due to Microbiology Exceedances = 10

Total adverse due to low Chlorine Residual = 1

---

The drinking water distributed to the City of Markham residents in 2016 was safe to drink and met all drinking water requirements. During the operation of the water distribution system during 2016, there were very few adverse sample incidents (0.17% 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

Drinking-Water System Number:	220004162
Drinking-Water System Name:	Markham Distribution System
Drinking-Water System Owner:	The Corporation of the City of Markham
Drinking-Water System Category:	Large Municipal Residential System
Period being reported:	January 1, 2016 to December 31, 2016

**Complete if your Category is Large Municipal Residential or Small Municipal Residential**

Does your Drinking-Water System serve more than 10,000 people? Yes [ x ] No [ ]

Is your annual report available to the public at no charge on a web site on the Internet? Yes [ x ] No [ ]

Location where Summary Report required under O. Reg. 170/03 Schedule 22 will be available for inspection.

- [www.markham.ca](http://www.markham.ca)
- 8100 Warden Ave. – Waterworks Department
- Markham Civic Centre – 101 Town Centre Blvd. – Contact Centre

**Complete for all other Categories.**

Number of Designated Facilities served:

Not applicable

Did you provide a copy of your annual report to all Designated Facilities you serve?

Yes [ ] No [ ]

Number of Interested Authorities you report to:

Not applicable

Did you provide a copy of your annual report to all Interested Authorities you report to for each Designated Facility?

Yes [ ] No [ ]

**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 350,000 residents and is comprised of approximately 1,100 kilometers of various size watermain, 10,910 watermain valves and 8,620 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**

Cathodic Protection of Iron Watermains	= \$427,245
Water Meter Replacement/Upgrades	= \$585,000
Watermain Replacement	= \$3,329,474
Watermain Replacement Design for 2016	= \$303,000



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

Incident Date	Parameter	Result	Unit of Measure	Corrective Action	Corrective Action Date
June 28, 2016 (AWQI #129963)	Total Coliform	P	P/A	Flush Mains and Resample	June 28, 2016
July 19, 2016 (AWQI # 130324)	Total Coliform	P	P/A	Flush Mains and Resample	July 19, 2016
August 3, 2016 (AWQI #130590)	Total Coliform	P	P/A	Flush Mains and Resample	August 3, 2016
August 9, 2016 (AWQI #130652)	Total Coliform	P	P/A	Flush Mains and Resample	August 9, 2016
August 9, 2016 (AWQI #130661)	Total Coliform	P	P/A	Flush Mains and Resample	August 9, 2016
August 10, 2016 (AWQI #130698)	Total Coliform	5	CFU/mL	Flush Mains and Resample	August 10, 2016
August 11, 2016 (AWQI #130721)	Total Coliform	3	CFU/mL	Flush Mains and Resample	August 11, 2016
August 30, 2016 (AWQI #130996)	Total Coliform	P	P/A	Flush Mains and Resample	August 30, 2016
Sept. 21, 2016 (AWQI #131262)	Combined Chlorine	<0.25	mg/L	Flush Mains and Resample	Sept. 21, 2016
October 4, 2016 (AWQI #131407)	Total Coliform	P	P/A	Flush Mains and Resample	October 4, 2016
Nov. 30, 2016 (AWQI #131965)	Total Coliform	3	CFU/mL	Flush Mains and Resample	Nov. 30, 2016

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	1,835	0-0	0-5	615	0-310



## 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 #)
<b>Turbidity</b>		
<b>Chlorine</b>	8,784 (Chlorine Analyzer)	Combined 0.81-1.68m g/L
	3,761(Grab)	Combined 0.27-1.92 mg/L
<b>Fluoride</b> (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

## 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, 2016	0.0006	mg/L	No
Arsenic	May 03, 2016	0.0008	mg/L	No
Barium	May 03, 2016	0.0215	mg/L	No
Boron	May 03, 2016	0.0233	mg/L	No
Cadmium	May 03, 2016	<0.0005	mg/L	No
Chromium	May 03, 2016	<0.0005	mg/L	No
*Lead	See Summary Below			
Mercury	May 03, 2016	<0.01	ug/L	No
Selenium	May 03, 2016	<0.0005	mg/L	No
Sodium	N/A			
Uranium	May 03, 2016	<0.0005	mg/L	No
Fluoride	N/A			
Nitrite	November 22, 2016	0.016	mg/L	No
Nitrate	November 22, 2016	0.456	mg/L	No

\*only for drinking water systems testing under Schedule 15.2; this includes large municipal non-residential systems, small municipal non-residential systems, non-municipal seasonal residential systems, large non-municipal non-residential systems, and small non-municipal non-residential systems



## 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	N/A *		
Distribution	20	All <0.0005 mg/L	0

\*The City of Markham has been exempt for Lead Testing from plumbing servicing private residences and plumbing servicing non-residential buildings. Relief was granted as sample results for seven rounds of sampling were confirmed to be well below the MOE's limit of 0.01mg/L.

## 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, 2016	<0.4	ug/L	No
Aldicarb	May 04, 2016	<4.5	ug/L	No
Aldrin + Dieldrin	May 03, 2016	<0.006	ug/L	No
Atrazine + N-dealkylated metabolites	May 03, 2016	<0.2	ug/L	No
Azinphos-methyl	May 04, 2016	<0.3	ug/L	No
Bendiocarb	May 04, 2016	<3.0	ug/L	No
Benzene	May 03, 2016	<0.1	ug/L	No
Benzo(a)pyrene	May 04, 2016	<0.01	ug/L	No
Bromoxynil	May 04, 2016	<0.4	ug/L	No
Carbaryl	May 04, 2016	<3.0	ug/L	No
Carbofuran	May 04, 2016	<3.0	ug/L	No
Carbon Tetrachloride	May 03, 2016	<0.2	ug/L	No
Chlordane (Total)	May 03, 2016	<0.006	ug/L	No
Chlorpyrifos	May 04, 2016	<0.2	ug/L	No
Cyanazine	May 03, 2016	<0.3	ug/L	No
Diazinon	May 04, 2016	<0.2	ug/L	No
Dicamba	May 04, 2016	<0.4	ug/L	No
1,2-Dichlorobenzene	May 03, 2016	<0.1	ug/L	No
1,4-Dichlorobenzene	May 03, 2016	<0.1	ug/L	No
Dichlorodiphenyltrichloroethane (DDT) + metabolites	May 03, 2016	<0.008	ug/L	No
1,2-Dichloroethane	May 03, 2016	<0.1	ug/L	No
1,1-Dichloroethylene (vinylidene chloride)(1,1-dichloroethene)	May 04, 2016	<0.3	ug/L	No
Dichloromethane	May 03, 2016	<1.0	ug/L	No
2-4 Dichlorophenol	May 04, 2016	<0.7	ug/L	No



2,4-Dichlorophenoxy acetic acid (2,4-D)	May 04, 2016	<0.8	ug/L	No
Diclofop-methyl	May 04, 2016	<0.4	ug/L	No
Dimethoate	May 04, 2016	<0.3	ug/L	No
Dinoseb	May 04, 2016	<0.5	ug/L	No
Diquat	May 03, 2016	<1.0	ug/L	No
Diuron	May 04, 2016	<3.0	ug/L	No
Glyphosate	May 03, 2016	<25	ug/L	No
Heptachlor + Heptachlor Epoxide	May 03, 2016	<0.008	ug/L	No
Lindane (Total)	May 03, 2016	<0.005	ug/L	No
Malathion	May 04, 2016	<0.2	ug/L	No
Methoxychlor	May 03, 2016	<0.009	ug/L	No
Metolachlor	May 03, 2016	<0.2	ug/L	No
Metribuzin	May 03, 2016	<0.3	ug/L	No
Monochlorobenzene	May 03, 2016	<0.1	ug/L	No
Paraquat	May 03, 2016	<1.0	ug/L	No
Parathion	May 04, 2016	<0.2	ug/L	No
Pentachlorophenol	May 04, 2016	<0.4	ug/L	No
Phorate	May 04, 2016	<0.2	ug/L	No
Picloram	May 04, 2016	<0.7	ug/L	No
Polychlorinated Biphenyls(PCB)	May 04, 2016	<0.02	ug/L	No
Prometryne	May 03, 2016	<0.2	ug/L	No
Simazine	May 03, 2016	<0.2	ug/L	No
THM (NOTE: show latest annual average)	Annual Average	9.23	ug/L	No
Temephos	May 04, 2016	<3	ug/L	No
Terbufos	May 04, 2016	<0.2	ug/L	No
Tetrachloroethylene	May 03, 2016	<0.3	ug/L	No
2,3,4,6-Tetrachlorophenol	May 04, 2016	<0.5	ug/L	No
Triallate	May 04, 2016	<4.0	ug/L	No
Trichloroethylene	May 03, 2016	<0.1	ug/L	No
2,4,6-Trichlorophenol	May 04, 2016	<0.5	ug/L	No
2,4,5-Trichlorophenoxy acetic acid (2,4,5-T)	May 04, 2016	<0.5	ug/L	No
Trifluralin	May 03, 2016	<0.006	ug/L	No
Vinyl Chloride	May 03, 2016	<0.2	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			