

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

*January 1 to December 31, 2018*

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 2018, no additional locations were warranted. Sampling is rotated through the 106 locations and the drinking water is tested for Chlorine residual, Bacteria, Trihalomethanes (THM), Nitrites & Nitrates, Lead, Organics & Inorganics in compliance with Ontario Regulation 170/03. The samples are collected by licensed Waterworks operators and analyzed by an accredited and provincially licensed 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, Conservation and Parks (MECP) 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 2018 follows:**

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### **Sampling Program:**

Total Number of Samples collected and tested in 2018= 7,165

### **Adverse Test Results:**

Total Number of Adverse Water Quality Incidents (AWQI) = 10

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

Total adverse due to Microbiology Exceedances = 6

Total adverse due to low Chlorine Residual = 2

Total adverse due to Observation during Watermain Break = 2

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The drinking water distributed to the City of Markham residents in 2018 was safe to drink and met all drinking water requirements. During the operation of the water distribution system during 2018, there were very few adverse sample incidents (0.14% 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, 2018 to December 31, 2018

<p><b><u>Complete if your Category is Large Municipal Residential or Small Municipal Residential</u></b></p> <p><b>Does your Drinking-Water System serve more than 10,000 people? Yes [ x ] No [ ]</b></p> <p><b>Is your annual report available to the public at no charge on a web site on the Internet? Yes [ x ] No [ ]</b></p> <p><b>Location where Summary Report required under O. Reg. 170/03 Schedule 22 will be available for inspection.</b></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> </ul> </div>	<p><b><u>Complete for all other Categories.</u></b></p> <p><b>Number of Designated Facilities served:</b></p> <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 5px auto;">Not applicable</div> <p><b>Did you provide a copy of your annual report to all Designated Facilities you serve? Yes [ ] No [ ]</b></p> <p><b>Number of Interested Authorities you report to:</b></p> <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 5px auto;">Not applicable</div> <p><b>Did you provide a copy of your annual report to all Interested Authorities you report to for each Designated Facility? Yes [ ] No [ ]</b></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 1,016 kilometers of various size watermains, 11,104 watermain valves and 8,713 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 an accredited and provincially licensed 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>= \$451,801</b>
<b>Watermain CIPP Lining (Watermain Rehabilitation)</b>	<b>= \$4,178,074</b>
<b>Water Meter Replacement/Upgrades</b>	<b>= \$676,446</b>
<b>Watermain Replacement</b>	<b>= \$435,685</b>
<b>Watermain Replacement Design for 2018</b>	<b>= \$305,883</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>July 17, 2018 (AWQI #140706)</b>	<b>Total Coliform</b>	<b>P</b>	<b>P/A</b>	<b>Flush Mains and Resample</b>	<b>July 17, 2018</b>
<b>July 17, 2018 (AWQI #140720)</b>	<b>Total Coliform</b>	<b>P</b>	<b>P/A</b>	<b>Flush Mains and Resample</b>	<b>July 17, 2018</b>
<b>July 20, 2018 (AWQI #140869)</b>	<b>On-Site Observational Adverse</b>	<b>n/a</b>	<b>n/a</b>	<b>Repair Watermain Break, Flush Mains and Sample</b>	<b>July 20, 2018</b>
<b>July 24, 2018 (AWQI #140961)</b>	<b>Combined Chlorine Residual</b>	<b>0.10</b>	<b>mg/L</b>	<b>Flush Mains and Resample</b>	<b>July 24, 2018</b>
<b>July 24, 2018 (AWQI #140982)</b>	<b>Combined Chlorine Residual</b>	<b>0.05</b>	<b>mg/L</b>	<b>Flush Mains and Resample</b>	<b>July 24, 2018</b>
<b>July 24, 2018 (AWQI # 140983 Location 1)</b>	<b>Total Coliform</b>	<b>P</b>	<b>P/A</b>	<b>Flush Mains and Resample</b>	<b>July 24, 2018</b>
<b>July 24, 2018 (AWQI # 140983 Location 2)</b>	<b>Total Coliform</b>	<b>P</b>	<b>P/A</b>	<b>Flush Mains and Resample</b>	<b>July 24, 2018</b>
<b>July 24, 2018 (AWQI # 140983 Location 3)</b>	<b>Total Coliform</b>	<b>P</b>	<b>P/A</b>	<b>Flush Mains and Resample</b>	<b>July 24, 2018</b>
<b>July 24, 2018 (AWQI #140987)</b>	<b>Total Coliform</b>	<b>P</b>	<b>P/A</b>	<b>Flush Mains and Resample</b>	<b>July 24, 2018</b>
<b>Dec. 13, 2018 (AWQI #141316)</b>	<b>On-Site Observational Adverse</b>	<b>n/a</b>	<b>n/a</b>	<b>Repair Watermain Break, Flush Mains and Sample</b>	<b>Dec. 13, 2018</b>

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

	<b>Number of Samples</b>	<b>Range of E.Coli Or Fecal Results (min #)-(max #)</b>	<b>Range of Total Coliform Results (min #)-(max #)</b>	<b>Number of HPC Samples</b>	<b>Range of HPC Results (min #)-(max #)</b>
<b>Raw</b>	<b>N/A</b>				
<b>Treated</b>	<b>N/A</b>				
<b>Distribution</b>	<b>1,845</b>	<b>0-0</b>	<b>0-Presence Of Total Coliforms</b>	<b>615</b>	<b>0-470</b>



**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>	8,760 (Chlorine Analyzer) 4,500 (Grab)	Combined: 0.05mg/L – 2.02 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
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 02, 2018	0.0009	mg/L	No
Arsenic	May 02, 2018	0.0009	mg/L	No
Barium	May 02, 2018	0.0237	mg/L	No
Boron	May 02, 2018	0.0321	mg/L	No
Cadmium	May 02, 2018	<0.0005	mg/L	No
Chromium	May 02, 2018	<0.0005	mg/L	No
*Lead	See Summary Below			
Mercury	May 02, 2018	<0.05	ug/L	No
Selenium	May 02, 2018	<0.0005	mg/L	No
Sodium	N/A			
Uranium	May 02, 2018	<0.0005	mg/L	No
Fluoride	N/A			
Nitrite	November 27, 2018	<0.05	mg/L	No
Nitrate	November 27, 2018	<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	0	n/a	n/a
Distribution	20	<0.0005 mg/L – 0.0014 mg/L	0

The City of Markham was granted relief from regulatory requirements contained in Schedule 15.1 of O. Reg. 170/03. This includes no lead testing from plumbing servicing of private residences, no lead testing from plumbing servicing non-residential buildings and reduced lead testing from distribution locations (10 per period). This reduced sampling was granted for the two periods of sampling, December 15, 2017 to April 15, 2018 and June 15, 2018 to October 15, 2018.

**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 02, 2018	<0.4	ug/L	No
Atrazine + N-dealkylated metabolites	May 02, 2018	<0.2	ug/L	No
Azinphos-methyl	May 02, 2018	<0.3	ug/L	No
Benzene	May 02, 2018	<0.1	ug/L	No
Benzo(a)pyrene	May 02, 2018	<0.01	ug/L	No
Bromoxynil	May 02, 2018	<0.4	ug/L	No
Carbaryl	May 02, 2018	<3.0	ug/L	No
Carbofuran	May 02, 2018	<3.0	ug/L	No
Carbon Tetrachloride	May 02, 2018	<0.2	ug/L	No
Chlorpyrifos	May 02, 2018	<0.2	ug/L	No
Diazinon	May 02, 2018	<0.2	ug/L	No
Dicamba	May 02, 2018	<0.4	ug/L	No
1,2-Dichlorobenzene	May 02, 2018	<0.1	ug/L	No
1,4-Dichlorobenzene	May 02, 2018	<0.1	ug/L	No
1,2-Dichloroethane	May 02, 2018	<0.1	ug/L	No
1,1-Dichloroethylene (vinylidene chloride or 1,1-dichloroethene)	May 02, 2018	<0.3	ug/L	No
Dichloromethane	May 02, 2018	<1.0	ug/L	No
2-4 Dichlorophenol	May 02, 2018	<0.7	ug/L	No
2,4-Dichlorophenoxy acetic acid (2,4-D)	May 02, 2018	<0.8	ug/L	No
Diclofop-methyl	May 02, 2018	<0.4	ug/L	No
Dimethoate	May 02, 2018	<0.3	ug/L	No
Diquat	May 02, 2018	<1.0	ug/L	No
Diuron	May 02, 2018	<3.0	ug/L	No
Glyphosate	May 02, 2018	<25	ug/L	No
Malathion	May 02, 2018	<0.2	ug/L	No
Metolachlor	May 02, 2018	<0.2	ug/L	No
Metribuzin	May 02, 2018	<0.3	ug/L	No
Monochlorobenzene	May 02, 2018	<0.1	ug/L	No
Paraquat	May 02, 2018	<1.0	ug/L	No



Pentachlorophenol	May 02, 2018	<0.4	ug/L	No
Phorate	May 02, 2018	<0.2	ug/L	No
Picloram	May 02, 2018	<0.7	ug/L	No
Polychlorinated Biphenyls(PCB)	May 02, 2018	<0.02	ug/L	No
Prometryne	May 02, 2018	<0.2	ug/L	No
Simazine	May 02, 2018	<0.2	ug/L	No
THM (NOTE: show latest annual average)	Annual Average	10.85	ug/L	No
Terbufos	May 02, 2018	<0.2	ug/L	No
Tetrachloroethylene(perchloroethylene)	May 02, 2018	<0.3	ug/L	No
2,3,4,6-Tetrachlorophenol	May 02, 2018	<0.5	ug/L	No
Triallate	May 02, 2018	<4.0	ug/L	No
Trichloroethylene	May 02, 2018	<0.1	ug/L	No
2,4,6-Trichlorophenol	May 02, 2018	<0.5	ug/L	No
Trifluralin	May 02, 2018	<0.006	ug/L	No
Vinyl Chloride	May 02, 2018	<0.2	ug/L	No
MCPA	May 02, 2018	<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			