

CITY OF MARKHAM – WATER SAMPLING PROGRAM

January 1 to December 31, 2021

To comply with the Ontario Drinking Water System Regulation, Markham collects and tests water samples throughout its distribution system at a total of 107 locations. The 107 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 2021 one additional location was added to the list of sampling locations. Sampling is rotated through the 107 locations and the drinking water is tested for Chlorine residual, Bacteria, Trihalomethanes (THM), Haloacetic Acids (HAA), 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 2021 follows:

Sampling Program:

Total Number of Samples collected and tested in 2021= 7,141

Adverse Test Results:

Total Number of Adverse Water Quality Incidents (AWQI) = 12

Breakdown of Adverse Results:

Total adverse due to Microbiology Exceedances = 9

Total adverse due to Organic Parameter = 1

Total adverse due to Observation during Watermain Break = 2

Total adverse due to low Chlorine Residual = 0

The drinking water distributed to the City of Markham residents in 2021 was safe to drink and met all drinking water requirements. During 2021 the operation of the water distribution system, there were very few adverse sample incidents (0.14% of all system samples 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, 2021 to December 31, 2021

<p><u>Complete if your Category is Large Municipal Residential or Small Municipal Residential</u></p> <p>Does your Drinking-Water System serve more than 10,000 people? Yes [x] No []</p> <p>Is your annual report available to the public at no charge on a web site on the Internet? Yes [x] No []</p> <p>Location where Summary Report required under O. Reg. 170/03 Schedule 22 will be available for inspection.</p> <ul style="list-style-type: none"> • www.markham.ca • 8100 Warden Ave. – Environmental Services Department, Waterworks Division 	<p><u>Complete for all other Categories.</u></p> <p>Number of Designated Facilities served:</p> <p style="text-align: center;">Not applicable</p> <p>Did you provide a copy of your annual report to all Designated Facilities you serve? Yes [] No []</p> <p>Number of Interested Authorities you report to:</p> <p style="text-align: center;">Not applicable</p> <p>Did you provide a copy of your annual report to all Interested Authorities you report to for each Designated Facility? Yes [] No []</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 [] Not applicable



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 353,982 residents and is comprised of approximately 1,092 kilometers of various size watermains, 11,204 watermain valves and 8,824 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

Cathodic Protection of Iron Watermains	= \$426,140
Watermain CIPP Lining (Watermain Rehabilitation)	= \$3,175,000
Water Meter Replacement/Upgrades	= \$1,013,200
Watermain Replacement	= \$ 5,593,102
Watermain Replacement Design for 2021	= \$266,245
Curb Box Inspection and Replacement	= \$715,000



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 and AWQI #	Parameter	Result	Unit of Measure	Corrective Action	Corrective Action Date
June 22, 2021 (AWQI # 154370)	Total Coliform	49	cfu/100mL	Flush Mains and Resample	June 20, 2021
July 06, 2021 (AWQI # 154537)	Total Coliform/E. coli	No Data, Overgrown	cfu/100mL	Flush Mains and Resample	July 06, 2021
July 06, 2021 (AWQI # 154538)	Total Coliform/E. coli	TC=1 EC=1	cfu/100mL	Flush Mains and Resample	July 06, 2021
July 20, 2021 (AWQI # 154758)	Total Coliform	49	cfu/100mL	Flush Mains and Resample	July 20, 2021
July 27, 2021 (AWQI # 154860)	Total Coliform	30	cfu/100mL	Flush Mains and Resample	July 27, 2021
July 27, 2021 (AWQI # 154861)	Total Coliform/E. coli	No Data, Overgrown	cfu/100mL	Flush Mains and Resample	July 27, 2021
Aug. 04, 2021 (AWQI # 154949)	Total Coliform	1	cfu/100mL	Flush Mains and Resample	Aug. 04, 2021
Aug. 19, 2021 (AWQI # 155171)	On-Site Observational Adverse	n/a	n/a	Repair Watermain, Flush Mains and Sample	Aug. 19, 2021
Sept. 22, 2021 (AWQI # 155611)	On-Site Observational Adverse	n/a	n/a	Repair Watermain, Flush Mains and Sample	Sept. 22, 2021
Sept. 27, 2021 (AWQI# 155668)	NDMA	0.016	ug/L	Flush Mains and Resample	Sept. 28, 2021
Oct. 14, 2021 (AWQI # 155995)	Total Coliform/E. coli	No Data, Overgrown	cfu/100mL	Flush Mains and Resample	Oct. 14, 2021
Nov. 09, 2021 (AWQI # 156478)	Total Coliform	13	cfu/100mL	Flush Mains and Resample	Nov. 09, 2021

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	1,840	0 - 1	0 – 49	614	0 - >2,530



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	N/A	
Chlorine	8,760 (Chlorine Analyzer) 4,472 (Grab)	Combined: 0.32mg/L – 1.99 mg/L
Fluoride (If the DWS provides fluoridation)	N/A	

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	April 27, 2021	0.0001	mg/L	No
Arsenic	April 27, 2021	0.0008	mg/L	No
Barium	April 27, 2021	0.023	mg/L	No
Boron	April 27, 2021	0.022	mg/L	No
Cadmium	April 27, 2021	<0.000015	mg/L	No
Chromium	April 27, 2021	<0.002	mg/L	No
*Lead	See Summary Below			
Mercury	April 27, 2021	<0.00002	mg/L	No
Selenium	April 27, 2021	<0.001	mg/L	No
Sodium	N/A		mg/L	No
Uranium	April 27, 2021	<0.00005	mg/L	No
Fluoride	N/A		mg/L	No
Nitrite	November 23, 2021	<0.01	mg/L	No
Nitrate	November 23, 2021	0.38	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	<0.00002 mg/L – 0.00045 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 in 2021, December 15, 2020 to April 15, 2021 and June 15, 2021 to October 15, 2021.

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	April 27, 2021	<0.3	ug/L	No
Atrazine + Metabolites	April 27, 2021	<0.5	ug/L	No
Azinphos-methyl	April 27, 2021	<1.0	ug/L	No
Benzene	April 27, 2021	<0.5	ug/L	No
Benzo(a)pyrene	April 27, 2021	<0.006	ug/L	No
Bromoxynil	April 27, 2021	<0.5	ug/L	No
Carbaryl	April 27, 2021	<3.0	ug/L	No
Carbofuran	April 27, 2021	<1.0	ug/L	No
Carbon Tetrachloride	April 27, 2021	<0.2	ug/L	No
Chlorpyrifos	April 27, 2021	<0.5	ug/L	No
Diazinon	April 27, 2021	<1.0	ug/L	No
Dicamba	April 27, 2021	<10.0	ug/L	No
1,2-Dichlorobenzene	April 27, 2021	<0.5	ug/L	No
1,4-Dichlorobenzene	April 27, 2021	<0.5	ug/L	No
1,2-Dichloroethane	April 27, 2021	<0.5	ug/L	No
1,1-Dichloroethylene	April 27, 2021	<0.5	ug/L	No
Dichloromethane	April 27, 2021	<5.0	ug/L	No
2-4 Dichlorophenol	April 27, 2021	<0.2	ug/L	No
2,4-Dichlorophenoxy acetic acid (2,4-D)	April 27, 2021	<10.0	ug/L	No
Diclofop-methyl	April 27, 2021	<0.9	ug/L	No
Dimethoate	April 27, 2021	<1.0	ug/L	No
Diquat	April 27, 2021	<5.0	ug/L	No
Diuron	April 27, 2021	<5.0	ug/L	No
Glyphosate	April 27, 2021	<25.0	ug/L	No
Haloacetic Acids (HAA)	Running Annual Average of Quarterly Results	< 5.3	ug/L	No
Malathion	April 27, 2021	<5.0	ug/L	No
Metolachlor	April 27, 2021	<3.0	ug/L	No



Metribuzin	April 27, 2021	<3.0	ug/L	No
Monochlorobenzene	April 27, 2021	<0.5	ug/L	No
Nitrosodimethylamine (NDMA)	Running Annual Average of Quarterly Results	0.0025	ug/L	No
Paraquat	April 27, 2021	<1.0	ug/L	No
Pentachlorophenol	April 27, 2021	<0.1	ug/L	No
Phorate	April 27, 2021	<0.3	ug/L	No
Picloram	April 27, 2021	<15.0	ug/L	No
Polychlorinated Biphenyls(PCB)	April 27, 2021	<0.05	ug/L	No
Prometryne	April 27, 2021	<0.1	ug/L	No
Simazine	April 27, 2021	<0.5	ug/L	No
THM (NOTE: show latest annual average)	Running Annual Average of Quarterly Results	11.91	ug/L	No
Terbufos	April 27, 2021	<0.5	ug/L	No
Tetrachloroethylene	April 27, 2021	<0.5	ug/L	No
2,3,4,6-Tetrachlorophenol	April 27, 2021	<0.2	ug/L	No
Triallate	April 27, 2021	<10.0	ug/L	No
Trichloroethylene	April 27, 2021	<0.5	ug/L	No
2,4,6-Trichlorophenol	April 27, 2021	<0.2	ug/L	No
Trifluralin	April 27, 2021	<0.5	ug/L	No
Vinyl Chloride	April 27, 2021	<0.2	ug/L	No
MCPA	April 27, 2021	<10.0	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			