



Attachment 'A'

The Ontario Ministry of the Environment and Climate Change
Drinking Water System Inspection Report
February 02, 2017



Ontario

Ministry of the Environment and Climate Change

MARKHAM DISTRIBUTION SYSTEM

Inspection Report

Site Number:	220004162
Inspection Number:	1-D8P1M
Date of Inspection:	Feb 02, 2017
Inspected By:	Manpreet Dhese

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OWNER INFORMATION:

Company Name: MARKHAM, THE CORPORATION OF THE CITY OF
Street Number: 101 **Unit Identifier:**
Street Name: TOWN CENTRE Blvd N
City: MARKHAM
Province: ON **Postal Code:** L3R 9W3

CONTACT INFORMATION

Type: Supervisor **Name:** Peter Solymos
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Type: Main Contact **Name:** Helena Frantzke
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Type: Health Department **Name:** Bernard Mayer
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Title: Safe Water Manager, York Region Health Services Department

Type: Main Contact **Name:** June Little
Phone: (416) 661-6600 **Fax:**
Email: jlittle@trca.on.ca
Title: Senior Manager Planning, Development and Regulation

INSPECTION DETAILS:

Site Name: MARKHAM DISTRIBUTION SYSTEM
Site Address: 101 TOWN CENTRE BLVD N MARKHAM L3R 9W3
County/District: Markham
MOECC District/Area Office: York-Durham District
Health Unit: YORK REGION HEALTH SERVICES DEPARTMENT
Conservation Authority:
MNR Office:
Category: Large Municipal Residential
Site Number: 220004162
Inspection Type: Announced
Inspection Number: 1-D8P1M
Date of Inspection: Feb 02, 2017
Date of Previous Inspection: Jul 02, 2015

COMPONENTS DESCRIPTION

Site (Name): MOE DWS Mapping

Type: DWS Mapping Point **Sub Type:**

Site (Name): Markham Operation Office
Type: Other **Sub Type:** Other

Comments:

The Markham Distribution System is owned and operated by the City of Markham, and receives treated water from the City of Toronto and the Region of Peel. The trunk transmission lines, pumping stations, and water storage facilities located within the City of Markham are owned and operated by the Region of York. The Region of York measures and monitors the distribution water flows and volumes directed to the City of Markham through the use of nineteen (19) flow meters located along the Richmond Hill, Vaughan, Stouffville, Toronto and Markham boundaries.

The Markham Distribution System provides potable water to approximately 350,000 residents of Markham and consists of approximately 1,070 km of watermains, 8,620 hydrants, 10,910 valves, and 82,277 service connections.

INSPECTION SUMMARY:

Introduction

- The primary focus of this inspection is to confirm compliance with Ministry of the Environment and Climate Change (MOECC) legislation as well as evaluating conformance with ministry drinking water policies and guidelines during the inspection period.

This drinking water system is subject to the legislative requirements of the Safe Drinking Water Act, 2002 (SDWA) and regulations made therein, including Ontario Regulation 170/03, "Drinking Water Systems" (O. Reg. 170/03). This inspection has been conducted pursuant to Section 81 of the SDWA.

This report is based on an inspection of a "stand alone connected distribution system". This type of system receives treated water from a separately owned "donor" system. This report contains the elements required to assess key compliance and conformance issues associated with a "receiver" system. This report does not contain items associated with the inspection of the donor system, such as source waters, intakes/wells and treatment facilities.

This report is based on a "focused" inspection of the system. Although the inspection involved fewer activities than those normally undertaken in a detailed inspection, it contained critical elements required to assess key compliance issues. This system was chosen for a focused inspection because the system's performance met the ministry's criteria, most importantly that there were no deficiencies as identified in O. Reg. 172/03 over the past 3 years. The undertaking of a focused inspection at this drinking water system does not ensure that a similar type of inspection will be conducted at any point in the future.

This inspection report does not suggest that all applicable legislation and regulations were evaluated. It remains the responsibility of the owner to ensure compliance with all applicable legislative and regulatory requirements.

The City of Markham (The City) owns and operates Markham Distribution system. The City receives treated Lake Ontario water from the City of Toronto and the Region of Peel. The Region of York provides water storage and pressure boosting to the City and acts as a wholesaler of the water to the system. The City of Toronto, Region of Peel and the Region of York treatment and distribution systems were inspected separately from the Markham Distribution System.

The Markham Distribution System operates under Municipal Drinking Water Licence Number (MDWL) 021-101, Issue # 5, issued in November, 2016 and Drinking Water Works Permit Number (DWWP) 021-201, Issue #2, issued in August, 2014. During the inspection, Draft DWWP Issue # 3 and MDWL Issue # 6 were being reviewed by Ministry Engineers.

The data review period for this inspection is from July 1st, 2015 to January 30th, 2017.

Treatment Processes

- The owner had ensured that all equipment was installed in accordance with Schedule A and Schedule C of the Drinking Water Works Permit.

The system description contained within Schedule A of DWWP indicates that the system consists of three primary pressure districts and approximately 1006 kilometers of watermains and transmission mains. The draft DWWP has updated information regarding the distribution system. Minor modifications to the system have been documented on "Record of Watermains Authorized as a Future Alteration Form 1" forms that were available for review at the time of the inspection.

- The owner/operating authority was in compliance with the requirement to prepare Form 1 documents as

Treatment Processes

required by their Drinking Water Works Permit during the inspection period.

Fourteen Form 1s prepared for the installation /extension of the distribution system watermain during the inspection period were reviewed during the inspection.

- **The owner/operating authority was in compliance with the requirement to prepare Form 2 documents as required by their Drinking Water Works Permit during the inspection period.**
A Form 2 document was prepared for the vertical installation for the extension of a hydrant in the distribution system.

Treatment Process Monitoring

- **The secondary disinfectant residual was measured as required for the distribution system.**
Secondary disinfectant is measured throughout the distribution system by checking total and free chlorine residuals using handheld colorimeters during dead end hydrant flushing and microbiological parameters' sampling, various times a week. Also, a continuous on-line analyzer for the combined chlorine residual monitoring was installed at the City's Operations Center located at 8100 Warden Avenue on January 1, 2014. The data recorded by the analyzer was reviewed during this inspection. The City indicated that they will be installing another continuous chlorine analyzer at an appropriate location in the distribution system.
- **Operators were examining continuous monitoring test results and they were examining the results within 72 hours of the test.**
The City has a procedure in its operations manual 'Continuous Chlorine Analyzer monitoring' which indicates that the data results from the analyzer must be reviewed within 72 hour period after the previous review by the operator. The SCADA generates chlorine residual records and sends them to the ORO (Overall Responsible Operator) for the day, on daily basis, for review. The ORO enters any concern regarding the records in their "Supervisor's logbook" after reviewing the records.
- **All continuous monitoring equipment utilized for sampling and testing required by O. Reg.170/03, or Municipal Drinking Water Licence or Drinking Water Works Permit or order, were equipped with alarms or shut-off mechanisms that satisfy the standards described in Schedule 6.**
Section 6.3 of the City's DWQMS standard operating procedure for the analyzer indicates that an alarm will be sent to the ORO on their cell phone if there is a loss of communication (due to power outage, equipment malfunction or no flow sensing), low sample flow or combined flow reading less than equal to 0.4 mg/l and greater than 2.10 mg/l.
- **Continuous monitoring equipment that was being utilized to fulfill O. Reg. 170/03 requirements was performing tests for the parameters with at least the minimum frequency specified in the Table in Schedule 6 of O. Reg. 170/03 and recording data with the prescribed format.**
As per table in Section 6-5 in Schedule 6 of O.Reg 170/03, a continuous analyzer in the distribution system is required to test the chlorine residual with the least frequency of 1 hour. The ORO indicated that the readings are being taken every 30 seconds; and any reading below the alarm setting causes the alarm within 10 seconds. The SCADA data records minimum, maximum as well as an average combined residual value for the hour.
- **All continuous analysers were calibrated, maintained, and operated, in accordance with the manufacturer's instructions or the regulation.**
The operators compare the grab sample results for the calculated combined chlorine with the chlorine analyzer readings three times a week to see if there is any trend in the difference between the two values. Any five consecutive values with the difference higher than 0.10 mg/l will trigger adjustments to the continuous analyzer by the instrumentation specialist. As a regular maintenance, the continuous analyzer is cleaned/calibrated by the City's instrumentation specialist on a monthly basis. Also, the analyzer is calibrated by the manufacturer's

Treatment Process Monitoring

technician twice every year.

Distribution System

- Existing parts of the distribution system that are taken out of service for inspection, repair or other activities that may lead to contamination, and all new parts of the distribution system that come in contact with drinking water, were disinfected in accordance with Schedule B, Condition 2.3 of the Drinking Water Works Permit, or an equivalent procedure (i.e. the Watermain Disinfection Procedure).

At the time of the inspection, Drinking Water Quality Management Standard procedure documents were in place that met the provisions of AWWA C651, which is a requirement of Condition 2.3 of the City's DWWP. Watermain breaks and commissioning records showed that the disinfection procedures were followed for the inspection period. A review of the watermain break form indicated that microbiological samples are taken after each repair of the watermain/service line, regardless of the severity of the break.

Operations Manuals

- The operations and maintenance manuals contained plans, drawings and process descriptions sufficient for the safe and efficient operation of the system.
Up to date plans, maps and manuals are available to the staff at the City's Operations Center located at 8100 Warden Avenue, Markham. It was reported that the plans are printed every year to ensure that the most up to date versions are available.
- The operations and maintenance manuals met the requirements of the Drinking Water Works Permit and Municipal Drinking Water Licence issued under Part V of the SDWA.
Condition 16 of the MDWL requires the operations and maintenance manual include at a minimum:
 - The requirements of the Licence and associated procedures;
 - The requirements of the DWWP;
 - A description of the processes used to maintain secondary disinfection within the DWS;
 - Procedures for monitoring and recording in-process parameters necessary for the control of any treatment subsystem and for assessing performance of the System;
 - Procedures for the operation and maintenance of monitoring equipment;
 - Contingency plans and procedures for the provision of adequate equipment and material to deal with emergencies, upset conditions and equipment breakdown;
 - Procedures for dealing with complaints related to the drinking water system, including the recording of the nature of the complaint and any investigation and corrective action taken in response to the complaint; and
 - Procedures related to any altered operations and maintenance of the DWS.A review of the operations manual indicated that procedures from the above list, which are relevant to the operation/maintenance of the distribution system, have been included in the manual.

Logbooks

- Records or other record keeping mechanisms confirmed that operational testing not performed by continuous monitoring equipment was being done by a certified operator, water quality analyst, or person who suffices the requirements of O. Reg. 170/03 7-5.
Logs for the Markham Distribution System consist of work orders as well as logbooks maintained at the main office for the waterworks, 8100 Warden Avenue. The review of these records indicated that the entries have been made by the certified operators only.
During the review of the logs, it was noted that the unused portion of the daily log pages are not being crossed out. It is recommended that the operators cross out the unused page of the logbook from the previous day before starting the new page, to make the log book entries more eligible.

Security

- The owner had provided security measures to protect components of the drinking water system.

The majority of the drinking water components are unexposed. During the inspection, the ORO indicated that the sampling stations in the distribution system are locked and the hydrants in the areas of concern as well as areas with the new development are equipped with anti-tampering devices, to prevent unauthorized use. The extra equipment is stored securely at 8100 Warden Avenue in Markham. By-law #1602 protects the City's hydrants from vandalism. Also, the City utilizes a card system for accessing their bulk water station.

Certification and Training

- The overall responsible operator had been designated for each subsystem.

The Markham Distribution System has a procedure in place for the staff coverage. As part of the procedure, the four waterworks supervisors are assigned to stand-by duties on a rotational basis. The standby supervisor is designated as the ORO.

- Operators in charge had been designated for all subsystems which comprised the drinking-water system.
- The eligible operators are assigned as OIC (Operator In Charge), on rotational basis, during weekly scheduling.

Water Quality Monitoring

- All microbiological water quality monitoring requirements for distribution samples were being met.

As per Section 10-2.(b), Schedule 10 of O.Reg 170/03, based on the population of 350,000, the City is required to collect 135 (100+ 35) samples every month, with at least three of the samples be taken each week. These samples are required to be tested for E.Coli, Total Coliforms and Heterotrophic Plate Count (25 percent of the required samples). The data review for the inspection period indicated that the required number of samples were taken. The review of the sampling results for the inspection period indicated that none of the samples showed the presence of E.Coli, fourteen of the samples taken showed the presence of total coliforms and the sampling results for HPC ranged from 0-320 CFU/ml.

- All trihalomethanes water quality monitoring requirements prescribed by legislation were conducted within the required frequency.

As per Section 13-6 of Schedule 13 of O.Reg 170/03, the City is required to take at least one sample in the distribution system, in each calendar quarter, from a point in the distribution system, or plumbing connected to the drinking water system, that is likely to have an elevated potential for the formation of trihalomethanes. The review of the sampling data indicated that atleast 12 samples at different locations were taken during each calendar quarter during the inspection period. The running annual average for the system, as of the last sample results, is 12.87 micro-gram per liter.

- Records confirmed that chlorine residual tests were being conducted at the same time and at the same location that microbiological samples were obtained.

The data review indicated that free and total chlorine residuals are taken to record combined chlorine during each microbiological parameter sampling.

Water Quality Assessment

- Records did not show that all water sample results taken during the inspection review period did not exceed the values of tables 1, 2 and 3 of the Ontario Drinking Water Quality Standards (O.Reg. 169/03).

There were fourteen reported adverse water quality incidents for the presence of total coliforms in the distribution water sample taken, during the inspection period.

Reporting & Corrective Actions

- **Corrective actions (as per Schedule 17) had been taken to address adverse conditions, including any other steps that were directed by the Medical Officer of Health.**

Corrective actions were taken as required for the incidents reported for the presence of total coliforms and one incident reported for low chlorine at three different locations in the distribution system, during the inspection period.

- **All required notifications of adverse water quality incidents were immediately provided as per O. Reg. 170/03 16-6.**
- **Where required continuous monitoring equipment used for the monitoring of chlorine residual and/or turbidity triggered an alarm or an automatic shut-off, a qualified person responded in a timely manner and took appropriate actions.**
- **All changes to the system registration information were provided within ten (10) days of the change.**

During the inspection, the compliance coordinator clarified that the information regarding the system receiving the water from the City has been included by mistake in the City's information with the Ministry and is required to be removed. Also, the information recorded with the Ministry regarding the submission of a new Laboratory Submission Notification form (LSN) is for the parameter 2 methyl-4chlorophenoxyacetic acid (MCPA), not for Microcystin, so it needs to be corrected too. The compliance coordinator for the City was provided with the form to submit the corrected information to the Ministry's Information Branch.

Other Inspection Findings

NON-COMPLIANCE WITH REGULATORY REQUIREMENTS AND ACTIONS REQUIRED

This section provides a summary of all non-compliance with regulatory requirements identified during the inspection period, as well as actions required to address these issues. Further details pertaining to these items can be found in the body of the inspection report.

Not Applicable

SUMMARY OF RECOMMENDATIONS AND BEST PRACTICE ISSUES

This section provides a summary of all recommendations and best practice issues identified during the inspection period. Details pertaining to these items can be found in the body of the inspection report. In the interest of continuous improvement in the interim, it is recommended that owners and operators develop an awareness of the following issues and consider measures to address them.

Not Applicable

SIGNATURES

Inspected By:

Manpreet Dhese

Signature: (Provincial Officer)



Reviewed & Approved By:

Lisa Williamson

Signature: (Supervisor)



Review & Approval Date:

02 MAR. 2017

Note: This inspection does not in any way suggest that there is or has been compliance with applicable legislation and regulations as they apply or may apply to this facility. It is, and remains, the responsibility of the owner and/or operating authority to ensure compliance with all applicable legislative and regulatory requirements.



Ministry of the Environment
Drinking Water System Inspection Report

APPENDIX A
INSPECTION RATING RECORD

Ministry of the Environment - Inspection Summary Rating Record (Reporting Year - 2016-2017)

DWS Name: MARKHAM DISTRIBUTION SYSTEM
DWS Number: 220004162
DWS Owner: Markham, The Corporation Of The City Of
Municipal Location: Markham

Regulation: O.REG 170/03
Category: Large Municipal Residential System
Type Of Inspection: Adhoc
Inspection Date: February 2, 2017
Ministry Office: York-Durham District

Maximum Question Rating: 303

Inspection Module	Non-Compliance Rating
Treatment Processes	0 / 22
Distribution System	0 / 21
Operations Manuals	0 / 28
Logbooks	0 / 14
Certification and Training	0 / 14
Water Quality Monitoring	0 / 43
Reporting & Corrective Actions	0 / 70
Treatment Process Monitoring	0 / 91
TOTAL	0 / 303

Inspection Risk Rating | 0.00%

FINAL INSPECTION RATING: | 100.00%

Ministry of the Environment - Detailed Inspection Rating Record (Reporting Year - 2016-2017)

DWS Name: MARKHAM DISTRIBUTION SYSTEM
DWS Number: 220004162
DWS Owner: Markham, The Corporation Of The City Of
Municipal Location: Markham

Regulation: O.REG 170/03
Category: Large Municipal Residential System
Type Of Inspection: Adhoc
Inspection Date: February 2, 2017
Ministry Office: York-Durham District

Maximum Question Rating: 303

Inspection Risk Rating 0.00%

FINAL INSPECTION RATING: 100.00%