



Report to: General Committee

Date Report Authored: January 23, 2017

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**SUBJECT:** Annual Water Quality Report (January – December 2016)  
**PREPARED BY:** Helena Frantzke, Ext 2449  
Water Quality Coordinator, Waterworks

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**RECOMMENDATION:**

- 1) THAT the report titled “Annual Water Quality Report (January-December 2016)” as required by Schedule 22 of Ontario Regulation 170/03, under the *Safe Drinking Water Act, 2002*, enclosed herein be received;
- 2) THAT the Annual 2016 Regulatory Water Quality Report (Attachment “A”), containing information for the Ministry of the Environment and Climate Change (MOECC) on water supply and quality as required by Section 11 of Ontario Regulation 170/03, under the *Safe Drinking Water Act, 2002*, be received;
- 3) THAT Council acknowledge that staff posted the Annual 2016 Detailed Regulatory Water Quality Report on the City’s website and that it has been made available electronically and in hard copy version by February 28, 2017 as per regulations;
- 4) AND FURTHER THAT Staff be authorized and directed to do all things necessary to give effect to this resolution.

**EXECUTIVE SUMMARY:**

As per Provincial Regulation 170/03, under the *Safe Drinking Water Act, 2002*, the City of Markham is mandated to produce the following two reports:

- 1) An annual report summarizing water quality information. This report outlines how the City of Markham receives its water, a description of the drinking water system and the water quality results for the period from January 1, 2016 to December 31, 2016. In addition, this report is required to be made available to the public upon request. The annual report has been posted on the Markham website and is available at the Contact Centre (Civic Centre) and at the Waterworks Department (8100 Warden Ave.). The regulatory requirements for such a report are met in this way and a copy of the report has been enclosed as Attachment “A”, for Council reference.
- 2) A report prepared for Council is to be submitted by March 31, 2017. This report is to inform Council on any regulatory requirements that have not been met during the period of January 1, 2016 to December 31, 2016. For each requirement not met, Council is to be informed of what corrective actions were taken. In addition, a summary is to be provided of the quantities and flow rates of the water supplied during the same period. This report enclosed herein ensures that Markham has met all regulatory requirements.

Markham's customers purchased 31,972,655 m<sup>3</sup> of water over 366 days in 2016. Representative water quality sampling was undertaken throughout the distribution system and analyzed according to O. Reg 170/03. Of the total 6,389 samples taken in 2016, only 11 samples (0.17%) were reported as Adverse Water Quality Incidents (AWQIs). Of the 11 samples, 10 were for microbiological indicators (tested positive for Total Coliforms). The remaining 1 sample was for deficient chlorine residual. For all of the adverse incidents, the City of Markham performed the required regulatory notifications and corrective actions to rectify the situation.

**PURPOSE:**

To inform Council, as owners of the drinking water system, on the quality of drinking water provided to the residents of Markham in 2016 through the water distribution system. By doing so, we are meeting the requirements of Schedule 22 of Ontario Regulation 170/03, under the *Safe Drinking Water Act, 2002*.

To provide Council with a summary on the more detailed & technical annual water quality report (included as Attachment "A"). This annual report has been prepared and made available to the public prior to February 28, 2017 via Markham's website, at the Contact Centre and at the Waterworks Department, 8100 Warden Avenue. This annual report details the drinking water system, sampling activity, corrective actions and any major monetary expenses incurred in 2016.

**BACKGROUND:**

In order to meet regulatory requirements and to strengthen customer confidence in the quality of the City of Markham's drinking water supply, Waterworks prepares annual update reports on the status of drinking water quality.

- 1) Enclosed, as Attachment "A", is the 2016 Annual Water Quality Report, which is intended to be a standalone document. This detailed, technical and statistical report summarizes the 2016 water distribution system, for: results of lab tests and corrective actions taken, and any major expenses incurred. The Regulation also requires that this report be made available to the public, free of charge, and be posted on the City of Markham's website on or before February 28, 2017.
- 2) The 2016 Annual Water Quality Report to Council, contained herein, is intended to inform Council on the performance of the water distribution system over the past year and to provide specific information that meets the Ontario Regulation 170/03 requirements concerning Markham's Drinking Water Distribution System.

**2016 Drinking Water System Information**

The City of Markham's drinking water system is strictly a distribution system. We do not operate any treatment plants and therefore the rated capacity of our system, as requested by the MOECC, is not applicable. The Region of York receives treated water from both the City of Toronto and the Region of Peel, stores and distributes it to various municipalities, including Markham, through trunk watermain from York and Toronto.

The City of Markham purchases its water entirely through the Region of York as the wholesaler, and distributes this water to its residents through metered connections.

#### Water Supplied During 2016

The City of Markham customers (including residential, industrial, commercial and institutional) purchased a total of 31,972,655 m<sup>3</sup> of water over 366 days in 2016. This amounts to an average of 2,664,388 m<sup>3</sup>/ month or 87,357 m<sup>3</sup>/day.

#### 2015 Drinking Water Quality Sampling Results

Ontario's Drinking Water Systems Regulation (O.Reg.170/03) requires all drinking water system owners to collect and test a minimum prescribed number of representative water quality samples for its distribution system. It further requires that drinking water system owners prepare an annual report (in MOE format) on the operation and the quality of drinking water within their jurisdictional boundaries. Markham Waterworks Department has complied with this requirement.

During the period from January 1, 2016 to December 31, 2016, the total number of water samples collected and tested by Waterworks Operators was 6,389. These samples were tested for the presence of bacteria (*Escheria coli*, Total Coliforms, and Heterotrophic Plate Count), for chemical analysis (Trihalomethanes (THM), Lead (Pb), Nitrate (NO<sup>3-</sup>) & Nitrite (NO<sup>2-</sup>), Organic and Inorganic chemical scans) and for chlorine residuals as required.

#### **2016 TOTAL NUMBER OF WATER SAMPLES**

PARAMETER	# SAMPLES TAKEN (TOTAL 6,389)	REPORTABLE TO MOECC	ADVERSE RESULT
MICROBIOLOGY - Scheduled (Total Coliforms / E. coli)	1,835	Yes	9
MICROBIOLOGY - Scheduled (HPC)	615	Not applicable	Not applicable
MICROBIOLOGY -Unscheduled (Total Coliforms /E. coli for Watermain Breaks and Resaples)	84	Yes	1
CHLORINE	3,761	Yes	1
OTHERS (Organic, Inorganic, )	94	Yes	0

For the calendar year January 1, 2016 to December 31, 2016; an annual regulatory report was prepared (MOECC format) in January 2017 on the Markham Water Distribution System and is enclosed as Attachment "A". This report was posted prior to Feb. 28, 2017 as required by the Regulation. In this report, we are detailing the eleven (11) adverse sampling incidents which are summarized below.

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In addition to the required number of samples tested for microbiological parameters every week during our regular sampling process, Markham takes samples following every watermain repair, regardless of severity. These proactive procedures could lead to an increase in the number of reported adverse water quality incidents. However, they are necessary to enable faster response to potential adverse conditions.

In 2016 there were eleven (11) reports of adverse water quality incidents, out of a total of 6,389 samples, which did not meet the Ontario's Drinking Water Systems Regulation (O. Reg. 170/03).

#### Adverse Water Quality – Presence of Bacteria

Of the 1,835 samples tested for microbiology during 2016 on the drinking water system as part of our regular sampling, only seven (7) samples detected the presence of total coliform which led to nine (9) separate adverse water quality incidences. In addition during unscheduled sampling, following a watermain break, one (1) sample detected presence of total coliform. The detection of total coliform in drinking water has had a longstanding history of use as an indicator of drinking water safety. Total coliform bacteria are common in the environment (soil or vegetation) and are generally harmless. Upon being notified by the York-Durham Regional Environmental Lab (YDREL) that a given sample did not meet the water quality regulations for bacteria, Waterworks staff immediately notified the York Region Medical Officer of Health (MOH) and the MOECC Spills Action Centre. Senior staff were informed of all incidents by email. Immediate and proactive corrective actions were followed as per Standard Operating Procedures for responding to an adverse water quality test result. In such incidents the location which failed is resampled along with one location upstream and one location downstream of the initial location some distance away.

Markham's past experience has been the detection of total coliform bacteria in water samples have been a result of external influences rather than being caused by the water supply itself, such as:

- Sampling Error where contaminants get in the water from outside the tap or from the sampler
- Issues with the sample bottle (broken seal)

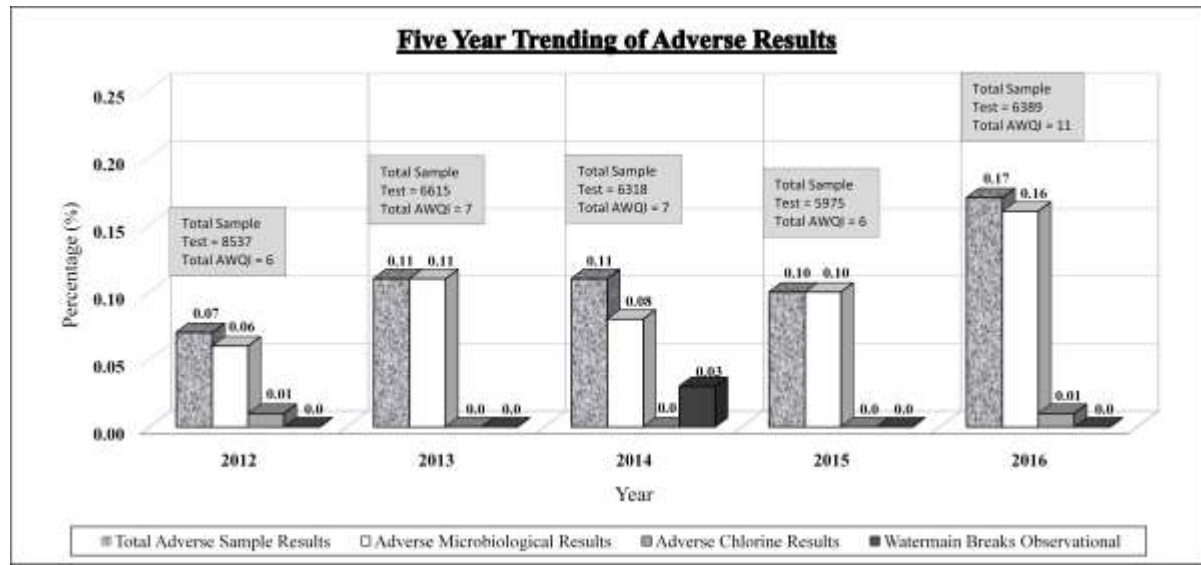
These false positives occur from time to time and are more prevalent during late spring and summer, with warmer temperatures. During these incidents, the chlorine levels measured at the time of taking the samples were of sufficient strength to provide effective, ongoing disinfection, well above the MOECC limits as well as our internal threshold limits.

#### Adverse Water Quality – Low Chlorine Residual

During an investigation of lower chlorine residuals in the Thornhill area on September 21, 2016, a deficient chlorine residual was detected in one (1) sample leading to adverse results. Waterworks immediately notified the MOECC & MOH. Corrective action was taken to continuously flush the watermain until acceptable chlorine residual levels in the area were established or restored.

### **5 Year Trending of Water Sampling:**

The graph below depicts the adverse sample results of the last 5 years (total sample test numbers, % adverse and source of the adverse incident).



### **Conclusions:**

In 2016, the drinking water distributed to the City of Markham residents continued to be of high quality. During the operation of the water distribution system during 2016, there were very few adverse reports (0.17% of all system tests undertaken) and these were immediately acted upon and resolved. The drinking water system is maintained by Waterworks with continual improvements and programs in place to ensure excellent water quality.

### **FINANCIAL CONSIDERATIONS AND TEMPLATE: (external link)**

Not Applicable

### **HUMAN RESOURCES CONSIDERATIONS**

Not Applicable

### **ALIGNMENT WITH STRATEGIC PRIORITIES:**

The Annual Water Quality Report (January – December 2016) on the drinking water system meets legislative requirements and is consistent with the City's corporate goals of Infrastructure Management and Quality Community.

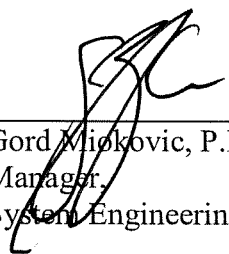
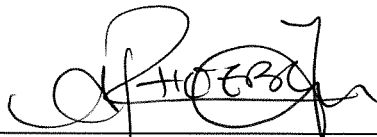
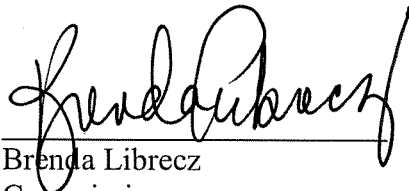
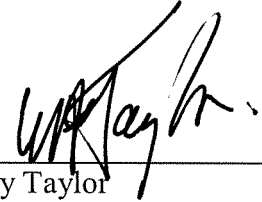
These goals enhance several key Waterworks service delivery components:

- Proactive and preventative strategies to identify and manage risks to public health;
- Continuous Improvement of Waterworks activities and service delivery;

**BUSINESS UNITS CONSULTED AND AFFECTED:**

Not Applicable

The undersigned represent the Top Management of City of Markham's Drinking Water Distribution System, and by signing below the Top Management of the Operating Authority has reviewed the deficiencies, decisions and action items identified in the Management Review, and hereby communicating these results to the Owner.

**RECOMMENDED  
BY:**  
\_\_\_\_\_  
Gord Minkovic, P.Eng  
Manager,  
System Engineering  
\_\_\_\_\_  
Phoebe Fu, P. Eng.  
Director, Environmental  
Services  
\_\_\_\_\_  
Brenda Librecz  
Commissioner,  
Community and Fire Services  
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Andy Taylor  
CAO, City of Markham**ATTACHMENTS:**

Attachment "A" – 2016 Annual Water Quality Report

The contents of this report include:

1. A description of where the report will be located and made available to the public.
2. A brief description of the drinking water system.
3. A breakdown of major expenses incurred to install, repair or replace required equipment.
4. A summary of adverse water quality reports and corrective actions taken.
5. A summary of water quality testing results for microbiological, inorganic chemical, and organic chemical parameters.

The City of Markham has met the Regulation 170/03 submission dates and requirements of reporting for the annual water quality report.