

Ministry of the Environment

Safe Drinking Water
Branch

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Ministère de l'Environnement

Direction du contrôle de la qualité de l'eau
potable

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June 30, 2010

The Town of Markham
Waterworks Department
101 Town Centre Boulevard
Markham, Ontario L3R 9W3

Attention: Karen Dennison, Manager, System Engineering Waterworks Department

RE: Markham Distribution System (220004162)

File: SI YO MA TO 540

Please find attached the Ministry of the Environment's inspection report for the above facility. The report details the findings of the inspection that took place May 18, 2010. Please forward the action plan and/or response to the undersigned at York Durham District Office of the Ministry of the Environment by July 30, 2010.

Please note that "*Actions Required*" are linked to incidents of non-compliance with regulatory requirements contained within the Act, a regulation, or site-specific approvals, licenses, permits, orders or instructions. Such violations could result in the issuance of mandatory abatement instruments including Orders, tickets, penalties, or referrals to the ministry's Investigations and Enforcement Branch.

"*Recommended Actions*" convey information that the owner or operating authority should consider implementing in order to advance efforts already in place to address such issues as emergency preparedness, the availability of information to consumers, and conformance with existing and emerging industrial standards. Please note that items which appear as recommended actions do not, in themselves, constitute violations.

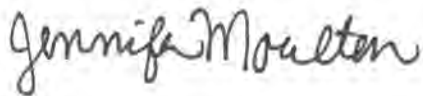
Please note, you will find in the report that bullets are shown in bold print and are the consistent and standard responses to the information gathered during the inspection. Statements shown in regular font provide additional site-specific details.

In order to measure individual inspection results, the Ministry has established an inspection compliance risk framework based on the principles of the Inspection, Investigation & Enforcement (II&E) Secretariat and advice of internal/external risk experts. The Inspection Summary Rating Record (IRR), included as Appendix E of the

inspection report, provides the Ministry, the system owner and the local Public Health Units with a summarized quantitative measure of the drinking water system's annual inspection and regulated water quality testing performance. Please note the attached IRR methodology memo describing how the risk rating model has improved to better reflect the health related and administrative non-compliance found in an inspection report. IRR ratings are published (for the previous inspection year) in the Ministry's Chief Drinking Water Inspectors' Annual Report.

I would like to thank Markham's Town Staff, especially Noris Dela Cruz, Karen Dennison, Peter Solymos, Anna Distefano, Eddy Wu, and Fiona McArthur, for the assistance afforded to me during the conduct of the compliance assessment. If you have any questions or concerns please contact myself or Marcel Parent, Drinking Water Program Supervisor, Central Region at 905-427-5630.

Yours truly,



Jennifer Moulton
Central Region Drinking Water Inspector
Safe Drinking Water Branch
Ministry of Environment
Phone: (905) 427-5618

cc:

Joe La Marca, Director of Health Protection
Bernard Mayer, Manager of Health Protection, York Region Health Unit
Marion Young, Administrative Clerk, York Region Health Unit
Adele Freeman, Director, Watershed Management, Toronto and Region Conservation Authority
John Livey, Chief Administrative Officer, Town of Markham
Fiona McArthur, Water Quality Coordinator, Town of Markham
Marcel Parent, York Durham District Office, MOE



Ontario

Ministry of the Environment

MARKHAM DISTRIBUTION SYSTEM Drinking Water System Inspection Report

DWS Number:	220004162
Inspection Number:	1-8EPE7
Date of Inspection:	May 18, 2010
Inspected By:	Jennifer Moulton

TABLE OF CONTENTS

- 1. Drinking Water System Owners Information**
- 2. Drinking Water System Inspection Report**

Appendix:

- A. Drinking Water System Components
Description**
- B. Permit, Licence, and/or Certificate of Approval**
- C. MOE Audit Sample Results**
- D. Inspection Rating Report**

OWNER INFORMATION:

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

CONTACT INFORMATION

Type:	Manager	Name:	Karen Dennison
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Type:	Supervisor	Name:	Peter Solymos
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Email:	ewu@markham.ca		
Title:	QMS Controller		

INSPECTION DETAILS:

DWS Name: MARKHAM DISTRIBUTION SYSTEM
DWS Address: 101 TOWN CENTRE BLVD N
County/District: Markham
District/Area Office: York-Durham District
DWS Category: Large Municipal Residential
DWS Number: 220004162
Inspection Type: Announced
Inspection Number: 1-8EPE7
Date of Inspection: May 18, 2010
Date of Previous Inspection: Oct 06, 2009

DRINKING WATER SYSTEM COMPONENTS DESCRIPTION

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

The Markham Distribution System (DS) is operated and maintained by the Town of Markham, and receives most of its distribution water from the City of Toronto. The York Water System was inter-connected with Peel Region in 2006, but the Town of Markham does not receive any water from the Peel System under normal operating conditions. The trunk transmission lines, pumping stations, and water storage facilities located within the Markham Distribution System are owned and operated by the Regional Municipality of York and the City of Toronto.

The City of Toronto operates and maintains four surface water treatment plants utilizing chemically assisted filtration, chlorination, fluoridation and chloramination processes. The Regional Municipality of York measures and monitors the distribution water flows and volumes directed to the Town of Markham through the use of nineteen (19) flow meters located along the Richmond Hill, Vaughan, Toronto and Markham boundaries. York Region also provides water storage and pressure boosting for the Markham system.

The Markham DS provides potable water to approximately 303,000 residents of Markham. The Markham Distribution System comprises approximately 981 km of watermains, 7,772 hydrants, 7,821 valve chambers, 9,281 valves, 188 blow-offs, and approximately 72,225 service connections.

Site (Name): Distribution System Sampling Station
Type: Other **Sub Type:** Other
Comments:

The sampling station located on Lanark Road (A01) in the Town of Markham, is a regular sampling location for the Markham DS.

Site (Name): Distribution System Sampling Station
Type: Other **Sub Type:** Other

Comments:

The sampling station located on Miller Avenue (B01) in the Town of Markham, is a regular sampling location for the Markham DS.

Site (Name): Distribution System Sampling Station

Type: Other

Sub Type: Other

Comments:

The sampling station located on Shields Court (B02) in the Town of Markham, is a regular sampling location for the Markham DS.

Site (Name): Distribution System Sampling Station

Type: Other

Sub Type: Other

Comments:

The sampling station located on Carlton Road (J02) in the Town of Markham, is a regular sampling location for the Markham DS.

Site (Name): Distribution System Sampling Station

Type: Other

Sub Type: Other

Comments:

The sampling station located on Reeve Drive (J07) in the Town of Markham, is a regular sampling location for the Markham DS.

Site (Name): Distribution System Sampling Station

Type: Other

Sub Type: Other

Comments:

The sampling station located on Sciberras Road (K01) in the Town of Markham, is a regular sampling location for the Markham DS.

Site (Name): Distribution System Sampling Station

Type: Other

Sub Type: Other

Comments:

The sampling station located on Drakefield Road (K04) in the Town of Markham, is a regular sampling location for the Markham DS.

Site (Name): Distribution System Sampling Station

Type: Other

Sub Type: Other

Comments:

The sampling station located on Robinson Street (K05) in the Town of Markham, is a regular sampling location for the Markham DS.

INSPECTION SUMMARY

INTRODUCTION

- * The primary focus of this inspection is to confirm compliance with Ministry of the Environment legislation and authorizing documents such as Orders and Certificates of Approval, as well as evaluating conformance with Ministry drinking water related policies and guidelines during the inspection period.

The Ministry is implementing a rigorous and comprehensive approach in the inspection of drinking water systems that focuses on the source, treatment and distribution components of the system as well as management practices.

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 all of the elements required to assess key compliance and conformance issues associated with a "receiver" system to ensure that the system was not being operated or managed in a "deficient" condition, as defined under O. Reg. 172/03. The report does not contain items associated with the inspection of the donor system, such as source waters, intakes/wells and treatment facilities.

On May 18, 2010, Provincial Officer, Jennifer Moulton conducted an announced on-site inspection of the Markham Distribution System. Documents pertaining to the system were reviewed both on-site and off-site following the physical inspection. Ministry audit samples were collected on June 8, 2010.

Information and assistance with the inspection was provided by The Town of Markham staff. The data reviewed for the inspection period covered by this report was October 6, 2009, through to May 18, 2010.

TREATMENT PROCESSES

- * A valid Permit, Licence or Approval issued under Part V of the SDWA, other than those issued for watermain construction, did not exist for the system.
- * The owner complied with the requirement to seek changes to the Permit, Licence or Approval issued under Part V of the SDWA where required, when changes were made.

The Town of Markham is currently preparing an application to seek changes to their licence for regulatory relief of corrective actions. The Town of Markham's donor systems have regulatory relief of corrective actions in the event of an adverse bacteriological test result indicating E. coli or total coliforms, where they are to flush the watermain to ensure that a combined chlorine residual of at least 0.25 mg/L rather than 1.0 mg/L is achieved. The Town of Markham is seeking similar relief.

In the Town of Markham's revoked Certificate of Approval No. 0955-6S9L9A they had regulatory relief of corrective actions if a report was required to be made under Section 18 of the Safe Drinking Water Act (SDWA) in respect of Aeromonas spp., Pseudomonas aeruginosa, Staphylococcus aureus, Clostridium spp., or fecal streptococci. The relief given included increasing the chloramine dose, and rather than ensuring that a combined residual of at least 1.0 mg/L was achieved at all points in the affected parts of the distribution system, a combined residual of 0.25 mg/L was required to be achieved. The Town of Markham is seeking similar relief for their current licence.

TREATMENT PROCESSES

- * **Records confirmed that the water treatment equipment which provides chlorination or chloramination for secondary disinfection purposes was operated so that at all times and all locations in the distribution system the chlorine residual was never less than 0.05 mg/l free or 0.25 mg/l combined.**

Although the Town of Markham does not provide treatment, they do monitor chlorine residuals in the distribution system. According to the data received from the Town of Markham the combined residuals were not less than 0.25 mg/L during the inspection period.

- * **The facility and equipment appeared to be maintained and in a fit state of repair.**

The equipment is in the process of being moved to 8100 Warden Avenue from 555 Miller Road in Markham. The equipment at 8100 Warden Avenue appeared to be maintained and in a fit state of repair.

DISTRIBUTION SYSTEM

- * **The owner had up-to-date plans for the distribution system.**

Markham's By-law 2007-142 is in place to regulate cross connections and backflow prevention in private plumbing systems to protect the drinking water supply. The By-law requires every owner of an applicable property to have certified testers conduct a survey of their plumbing to identify any potential cross-connections, and to identify the sufficiency of existing or required backflow prevention devices.

The applicable property owner is required to retain a certified tester to test backflow prevention devices annually. The By-law requires the surveys and testing to be reported to the Town of Markham. The completion of the first cross-connection survey and testing of backflow preventers are being phased-in according to the degree of hazard.

The Town of Markham has approximately 2000 Industrial, Commercial, and Institutional (ICI) properties.

Also, workshops and information sessions for property owners have been held.

- * **There was a cross-connection control/backflow prevention program, policy and/or by-law in place.**

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DISTRIBUTION SYSTEM

- * **Backflow preventers were installed at each service connection to Industrial/Commercial/Institutional and agricultural process that were considered high hazard facilities.**

The Town of Markham is currently implementing Phase 1 of the Back Flow Prevention Program. Phase 1 consists of three steps. The Town of Markham is currently on the first step where approximately 600 survey request letters were sent to severe risk properties. Out of those properties, approximately 60% have submitted their completed survey. The first step of phase 1 is planned to be completed by the end of 2011. The next step, starting in 2011, will be to send survey request letters to the 1000 unknown risk properties.

- * **There were no known cross connections between the distribution system and other water sources.**

At the time of the inspection the Town of Markham was not aware of any cross connections. Cross connection surveys are being carried out to identify any cross connections in accordance with Markham's By-law 2007-142.

- * **Existing parts of the distribution system that were taken out of service for inspection, repair or other activities that may lead to contamination, and all new parts of the distribution system that came in contact with drinking water, were disinfected in accordance with the Procedure for Disinfection of Drinking Water In Ontario.**

In accordance with condition 2.3.2 of the DWWP, the Watermain Testing procedure is equivalent to the AWWA procedures.

- * **There was a program for rehabilitation or replacement of watermains.**

According to the Watermain replacement records provided at the time of the inspection, the Town of Markham has planned watermain replacements up until 2014.

- * **The owner followed industry recognized standards or procedures in the material selection and design associated with distribution system construction and maintenance.**

In accordance with Condition 14.0 of the drinking water licence, the Town of Markham uses industry recognized standards or procedures for material selection and design.

- * **The owner had implemented a program for the flushing of watermains as per industry standards.**

The Town of Markham conducts regular flushing of mains with priority sites flushed more often than others.

- * **A program was in place for inspecting and exercising valves.**

The program involves inspecting and exercising valves. The Town of Markham is working towards exercising all valves at least once every four years. According to the records provided during the inspection, 300 valves were inspected and exercised from December 2, 2009 to March 31, 2010.

- * **There was a program in place for inspecting and operating hydrants.**

Hydrants are inspected and operated annually during the spring and summer months. Additional inspections are conducted in the fall to check if the hydrants need draining.

- * **There was a by-law or policy in place limiting access to hydrants.**

The Town of Markham's By-law #1602 outlines the access limits to hydrants.

- * **Consumer water usage, including industrial and commercial water users, was fully metered.**

DISTRIBUTION SYSTEM

- * **The owner had conducted an assessment of production volumes versus authorized consumption to determine the percentage of water loss in the distribution system.**

It was calculated that approximately 10.69% of the total amount of water distributed by the system was unaccounted for in 2009.

- * **The owner had undertaken efforts to identify, quantify and reduce sources of apparent water loss and/or established a leak detection/minimization program.**

A proactive leak detection strategy is in the development stages for the Town of Markham to identify, quantify, and repair unreported leaks. District Metered Areas (DMA) are being created and instrumented to enable monitoring for system anomalies and trending. This will allow Markham to monitor and adjust pressure, as well as better account for water usages and losses.

In addition, Markham actively pursues water main rehabilitation and replacement programs, and carries out the installation of anodes to reduce degradation of existing water mains which will reduce leakage. The Town of Markham is also determining better ways to predict the water usage by the fire department, municipal properties, and from watermain flushing. This will give a more accurate percentage of water loss in the distribution system.

Refer to Summary of Best Practice Issues and Recommendations for further recommendations.

- * **The distribution system pressure was monitored to alert the operator of conditions which may have lead to loss of pressure below the value under which the system is designed to operate.**

Static water levels are measured at fire hydrants across the Town of Markham during hydrant inspections. Also, pressure is monitored if a water pressure complaint is received. Low pressure zones (between 40 and 50 psi) have been identified, as a result of the monitoring.

- * **Based on the records available the owner was able to maintain proper pressures in the distribution system.**

The average day pressure in Markham is 70 psi. The minimum pressure required by the Town's design standard is 40 psi.

- * **The donor had provided an Annual Report to the receiver drinking water system.**

OPERATIONS MANUALS

- * **Operators and maintenance personnel had ready access to operations and maintenance manuals.**

Each operator has a binder with operation and maintenance procedures.

- * **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 were provided to the ministry in electronic format on a compact disc.

- * **The operations and maintenance manual contained a sampling plan.**

A sampling schedule was provided during the inspection for both microbiological sampling and inorganic/organic sampling.

- * **The operations and maintenance manuals contained instructions pertaining to the identification of adverse drinking water conditions, as well as prescribed notification and corrective actions.**

Markham's "Adverse of Exceedance of a Water Quality Test Response Standard Operating Procedure (SOP)" was available for review by the ministry.

OPERATIONS MANUALS

- * **The operations and maintenance manuals did meet the requirements of the Permit, Licence or Approval issued under Part V of the SDWA.**

The operations and maintenance manual was prepared by December 1, 2009, in accordance with Condition 16.4 of the Drinking Water Licence.

- * **The operation and maintenance manuals and the emergency/contingency plans were reviewed on a periodic basis.**

The operations and maintenance manual and emergency plan is reviewed on an annual basis.

LOGBOOKS

- * **Logs for the distribution subsystem(s) of the drinking water system contained the required information.**

Work done on the system and observations were recorded on work orders and customer service requests. The work orders and customer service requests were stored and filed in both hard copy and electronic copy.

A logbook is also kept at 8100 Warden Avenue, Markham. The logbook was reviewed on May 18, 2010.

- * **Logbook entries were made in chronological order.**
- * **The record system allowed the reader to unambiguously identify the person who made the logbook entry.**

There were 34 entries in the logbook where the marker of that entry was not identified. The Town of Markham was able to identify the marker of each of these entries by referring to other documents including the operator standby list. There were also a few instances where an unidentified operator scratched out errors in the logbook.

Refer to Summary of Best Practice Issues and Recommendations for further recommendations.
- * **Entries in the logbook were made only by appropriate and authorized personnel.**
- * **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.**

- * **For every required operational test and every required sample, a record was made of the date, time, location, name of the person conducting the test and result of the test.**

Chlorine residuals are recorded on each chain of custody as well on work orders using the tablets, then they are uploaded to Hansen.

- * **The operator-in-charge ensured that records were maintained of all adjustments made to the processes within his or her responsibility.**
- * **Logs or other record keeping mechanisms were available for at least five (5) years.**

Records are kept on site and are sent annually to archives where they can be acquired if immediately needed. Logbooks are kept on site. Records are also kept electronically in Hansen, which Markham commenced using in 2002.

CONTINGENCY/EMERGENCY PLANNING

CONTINGENCY/EMERGENCY PLANNING

- * **The owner had developed a written contingency/emergency plan as required by the Permit, Licence or Approval issued under Part V of the SDWA.**

The Town of Markham has an 'Emergency Management Procedure' within their DWQMS System, which includes the procedures for four different levels of emergencies. The waterworks emergency plan also contains a 'Fan Callout System', contact information, and information concerning the responsibilities of key persons, staff and other agencies. This is in accordance with Condition 16.2.5 of the Drinking Water Licence.

- * **The contingency/emergency plan was available for reference by all staff as required by the Permit, Licence or Approval issued under Part V of the SDWA.**

The Town of Markham staff has been given the emergency plan. The most recent copy of the 'Fan Callout' document is also available on the Town's intranet site for all staff.

- * **The contingency/emergency plan did provide for key equipment to be made available in the event of an emergency or upset condition.**

Spare equipment and materials were in the process of being transferred to 8100 Warden Avenue from 555 Miller Avenue, Markham. The Town of Markham also uses Hansen to track their parts inventory.

- * **The contingency/emergency plan addressed spill scenarios.**

The 'Fan Callout' document lists the contacts for spills.

- * **Spill containment was not provided for process chemicals.**

An explosion proof, storage locker at 8100 Warden Avenue contains the 12% sodium hypochlorite. At the time of the inspection it was noted there wasn't secondary containment for the approximate ten (10), five 5 Litre chlorine solution containers within the storage locker. Floor drains were not seen in the room with the storage locker.

Refer to Summary of Best Practice Issues and Recommendations for further recommendations.

- * **Clean-up equipment and materials were in place for the clean up of spills.**

SECURITY

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

The majority of the drinking water components are unexposed. The sample stations are locked, and extra equipment is stored securely at 555 Miller Avenue, and 8100 Warden Avenue in Markham. Also, newly installed fire hydrants are equipped with anti-tampering devices.

CONSUMER RELATIONS

- * **Water conservation was being practiced by the owner or operating authority.**

Markham's By-law #105-95, outlines restrictions for water usage between June 1 and September 30. Also, Markham is in a partnership with York Region for the "Water for Tomorrow Program."

- * **A documented system that records consumer complaints, steps taken to determine the cause of the issue, and corrective measures taken to alleviate the cause and prevent its reoccurrence did exist.**

Consumer complaints are managed through the Hansen system. The consumer complaint documents included details of the complaint and the actions taken. This is in accordance with Condition 16.2.6 of the Drinking Water Licence.

CONSUMER RELATIONS

- * **Required documents were available free-of-charge during normal business hours at a location accessible to the public.**

Documents are available at the Contact Centre inside the Civic Centre at 101 Town Centre Blvd, Markham. Documents are also available at the Town of Markham's office located at 8100 Warden Avenue, Markham during regular business hours, 8:30 AM to 4:30 PM.

- * **The owner did take effective steps to advise users of the water system of the availability of Annual Reports.**

Notification to the public of the availability of the 2009 annual report was provided by the Town of Markham's internet site, the Markham Economist & Sun newspaper, and upon public request.

- * **The owner posted the Annual Reports on the internet.**

CERTIFICATION AND TRAINING

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

The overall responsible operator (ORO) rotates weekly through the Waterworks Supervisor assigned to stand-by duties.

- * **Operators in charge had been designated for all subsystems which comprised the drinking-water system.**

- * **All activities that were undertaken by uncertified persons in the DW subsystems were overseen by persons having the prescribed qualifications.**

- * **All operators possessed the required certification.**

- * **Operator certificates or water quality analyst certificates were displayed in a conspicuous location at the workplace or at the premises from which the subsystem was managed.**

Operator certificates were on display at the Waterworks Operations Office at 8100 Warden Avenue, Markham.

- * **The classification certificates of the subsystems were conspicuously displayed at the workplace or at premises from which the subsystem was managed.**

The classification certificate was displayed at the at 8100 Warden Avenue in the Waterworks Operations Office and at the front entrance to the building.

- * **An adequately licenced operator was designated to act in place of the overall responsible operator when the overall responsible operator was unable to act.**

The Markham Distribution System has a procedure in place for personnel coverage. As part of the procedure Waterworks Supervisors are assigned to stand-by duties on a rotational basis. The supervisor on stand-by is designated as the ORO.

- * **The owner/operating authority was aware of the operator training and record keeping requirements, and they were taking reasonable steps to ensure that all operators receive the required training.**

The Town of Markham's Training Coordinator maintains a record of all operator training. An excel spreadsheet is maintained with the hours of training for each operator.

CERTIFICATION AND TRAINING

- * **Operators were regularly trained with respect to the contents of the operations and maintenance manual and Contingency/Emergency Plan.**

Staff are trained on the Contingency/Emergency Plan once a year. Records of the training were kept. According to the training records, the most recent Contingency/Emergency Plan training courses were offered in January and February 2010.

WATER QUALITY MONITORING

- * **Relief from water quality monitoring requirements had not been granted.**

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

The Town of Markham is collecting water samples and analyzing them for E. coli, total coliforms and heterotrophic plate count, as required.

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

Trihalomethanes (THMs) are monitored, as required.

- * **Trihalomethane samples were being collected from a point in the distribution system or connected plumbing system that was likely to have an elevated potential for the formation of trihalomethanes.**

The Town of Markham aims to get representative samples from each pressure zone.

- * **The owner ensured that water samples were taken at the prescribed location.**

- * **The owner had established water quality goals over and above regulatory requirements.**

The Town of Markham has established critical control limits for combined chlorine residual (less than or equal to 0.40 mg/L or greater than or equal to 1.7 mg/L), HPC (greater than or equal to 300), pH (less than or equal to 6.5 or greater than or equal to 8.5), nitrites (greater than or equal to 0.5 mg/L), nitrates (greater than or equal to 5.0 mg/L), trihalomethanes (greater than or equal to 0.05 mg/L), and lead (greater than or equal to 0.005 mg/L). If the sample results are outside these limits, there is a procedure to follow in order to increase the water quality.

- * **All sampling requirements for lead prescribed by schedule 15.1 of O. Reg. 170/03 were being met.**

The Town of Markham is required to collect sixty five (65) samples, per sampling period, in total for lead, as they qualify for the sample reduction. Lead sampling records demonstrate that the requirements were achieved for the last sampling period.

- * **All sampling requirements for alkalinity and pH prescribed by schedule 15.1 of O. Reg. 170/03 were being met.**

- * **The owner was conducting sampling beyond the minimum legislative requirements.**

The Town of Markham conducts sampling for sodium, fluoride, nitrite and nitrates, and Schedule 23 and 24 parameters which is not required by the distribution system.

- * **Samples for chlorine residual analysis were tested using an acceptable portable device.**

WATER QUALITY MONITORING

- * **The secondary disinfectant residual was measured as required for the distribution system.**

Chlorine residuals are collected daily, during dead end flushing, and with every microbiological sample. A summary of all chlorine residuals collected was provided electronically during the inspection.

- * **Records confirmed that the maximum free chlorine residual in the distribution system was less than 4.0 mg/L or that the combined chlorine residual was less than 3.0 mg/L.**

Through a review of the chlorine residual information provided at the time of the inspection, it appears that the maximum combined chlorine residual for the inspection period (October 6, 2009 to May 18, 2010) was 1.33 mg/L from a daily chlorine residual collected on April 20, 2010.

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

The chain of custodies, reviewed at the time of the inspection, confirmed that chlorine residual tests were conducted at the same time and same location the microbiological samples were taken.

- * **Records confirmed that disinfectant residuals were routinely checked at the extremities and "dead ends" of the distribution system.**

- * **Testing for parameters required by legislation, Order, or a Permit, Licence or Approval issued under Part V of the SDWA was conducted by laboratories in Ontario licenced to test for that parameter, or by eligible laboratories outside Ontario.**

Regulatory water samples are submitted for analysis to the York-Durham Regional Environmental Laboratory, which is a licensed laboratory by the Ministry of the Environment.

- * **The drinking water system owner had submitted written notices to the Director that identified the laboratories that were conducting tests for parameters required by legislation, Order Certificate of Approval (OWRA) or a Permit, Licence or Approval issued under Part V of the SDWA.**

Markham Distribution System submitted a laboratory services notification (LSN) update on January 23, 2008. The LSN declares York-Durham Regional Environmental Laboratory in Pickering, Ontario, as their contracted laboratory.

- * **Based on information provided by the owner/operator, samples were being taken and handled in accordance with instructions provided by the drinking-water system's laboratories.**

- * **The owner indicated that the required records are kept and will be kept for the required time period.**

The Town of Markham follows their DWQMS work instruction "Records Management – Water Quality" for record keeping. This document lists the required retention times, and the location of records. Records are also kept electronically in Hansen, which Markham commenced using in 2002.

WATER QUALITY ASSESSMENT

- * **The inspector collected audit samples during the inspection.**

Audit samples were collected on June 8, 2010, at the following sampling locations:

A01 – 25 Lanark Road

B01 – 555 Miller Avenue

B02 – 250 Shields Court

WATER QUALITY ASSESSMENT

J02 – 120 Carlton Road

J07 – 21 Reeve Drive

K01 – 61 Sciberras Road

K04 – 122 Drakefield Road

K05 – 90 Robinson Street

- * **Results of Ministry audit sampling met the standards included in the Ontario Drinking Water Quality Standards (O. Reg. 169/03) and O.Reg. 170/03.**
- * **Records show that all water sample results taken during the review period met the Ontario Drinking Water Quality Standards (O.Reg. 169/03).**

REPORTING & CORRECTIVE ACTIONS

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

During the inspection period, the Town of Markham reported 2 adverse water quality incidents to the Ministry's Spills Action Centre, including one delayed report of a low combined chlorine residual, and one Fecal streptococci presence. The corrective actions were performed as per applicable legislation.

- * **All required notifications of adverse water quality incidents were not immediately provided as per O.Reg. 170/03 16-6.**

A low combined chlorine residual of 0.14 mg/L from dead end flushing on September 10, 2009, was not reported immediately. The Town of Markham noticed this oversight while preparing their 2009 annual report on Monday January 18, 2010, and they immediately notified the Spills Action Centre (SAC) at that time. This is a non-compliance under Section 18(1) of the SDWA.

- * **All required notifications of adverse water quality incidents were provided as per O.Reg. 170/03 16-7.**

The Town of Markham provided written notices of adverse water quality within 24 hours of the verbal notifications, as required.

- * **In instances where written notice of issue resolution was required by regulation, the notice was provided as per O.Reg. 170/03 16-9.**

- * **All reporting requirements for lead sampling were complied with as per schedule 15.1-9 of O.Reg. 170/03.**

Test result reports were sent to residents and non-residential sampling locations, within seven days of the results being received by the Town.

- * **Annual Reports included the required information.**

- * **The Annual Report was prepared by February 28th of the following year.**

The 2009 Annual Report was prepared and posted on their website before February 28, 2010.

REPORTING & CORRECTIVE ACTIONS

- * **Summary Reports for municipal council were completed on time, included the required content, and were distributed in accordance with the regulatory requirements.**

The summary report was submitted to Council on March 1, 2010.

- * **The system was registered with the Ministry and provided the required notice containing information about the system.**

- * **All changes to the system registration information were provided within ten (10) days of the change.**

The profile information was last updated on January 28, 2010. The updates included the addition of a supplying system, an alternate contact update, and a population change.

OTHER INSPECTION FINDINGS

- * **The following issues were also noted during the inspection:**

a) There were 34 entries in the logbook where the marker of that entry was not identified. The Town of Markham was able to identify the marker of each of these entries by referring to other documents including the operator standby list. There were also a few instances where an unidentified operator scratched out errors in the logbook.

b) A proactive leak detection strategy is in the development stages for the Town of Markham to identify, quantify, and repair unreported leaks. District Metered Areas (DMA) are being created and instrumented to enable monitoring for system anomalies and trending. This will allow Markham to monitor and adjust pressure, as well as better account for water usages and losses.

In addition, Markham actively pursues water main rehabilitation and replacement programs, and carries out the installation of anodes to reduce degradation of existing water mains which will reduce leakage. The Town of Markham is also determining better ways to predict the water usage by the fire department, municipal properties, and from watermain flushing. This will give a more accurate percentage of water loss in the distribution system.

- * **The owner/operator had complied with all Orders or other control documents issued since the date of the previous inspection.**

There was one recommendation in last year's inspection report, which was to continue in the proactive leak detection program to identify factors contributing to unaccounted water loss. This program is in the development stages. Refer to Summary of Best Practice Issues and Recommendations for further recommendations from this inspection.

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.

1. All required notifications of adverse water quality incidents were not immediately provided as per O.Reg. 170/03 16-6.

A low combined chlorine residual of 0.14 mg/L from dead end flushing on September 10, 2009, was not reported immediately. The Town of Markham noticed this oversight while preparing their 2009 annual report on Monday January 18, 2010, and they immediately notified the Spills Action Centre (SAC) at that time. This is a non-compliance under Section 18(1) of the SDWA.

Action(s) Required:

The Town of Markham provided documentation following the incident describing how they plan to prevent this in the future. They immediately retrained all of the operators, to ensure they are aware of the requirement to report low chlorine residuals to their supervisor. The working instructions were updated to address the threshold for a chlorine adverse. The Town of Markham is in the process of moving forward with computer based tablets to allow the operator's chlorine residual entries to be uploaded in real time. They are also working on a program that will flag all results below or above the allowable limit. During the inspection, signs were posted in the Drinking Water Office reminding staff of the requirement to report combined chlorine residuals reading below 0.25 mg/L.

SUMMARY OF BEST PRACTICE ISSUES AND RECOMMENDATIONS

This section provides a summary of all best practice issues identified during the inspection period. Details pertaining to these items can be found in the body of the inspection report. Best Management Practices are recommendations and not mandatory requirements, but may lead to safe drinking water for the consumer.

In the interest of continuous improvement in the interim, it is recommended that owners and operators develop an awareness of the following practices and consider measures to implement them so that all drinking water systems continuously improve their processes.

1. Spill containment was not provided for process chemicals.

An explosion proof, storage locker at 8100 Warden Avenue contains the 12% sodium hypochlorite. At the time of the inspection it was noted there wasn't secondary containment for the approximate ten (10), five 5 Litre chlorine solution containers within the storage locker. Floor drains were not seen in the room with the storage locker.

Recommendation:

It is recommended that the Town of Markham explore options to provide secondary containment for the chlorine solution containers within their storage locker. One way to achieve this would be to place the chlorine solution containers into a larger empty container/bin. This is to ensure any chlorine solution leaks will be contained.

2. The following issues were also noted during the inspection:

a) There were 34 entries in the logbook where the marker of that entry was not identified. The Town of Markham was able to identify the marker of each of these entries by referring to other documents including the operator standby list. There were also a few instances where an unidentified operator scratched out errors in the logbook.

b) A proactive leak detection strategy is in the development stages for the Town of Markham to identify, quantify, and repair unreported leaks. District Metered Areas (DMA) are being created and instrumented to enable monitoring for system anomalies and trending. This will allow Markham to monitor and adjust pressure, as well as better account for water usages and losses.

In addition, Markham actively pursues water main rehabilitation and replacement programs, and carries out the installation of anodes to reduce degradation of existing water mains which will reduce leakage. The Town of Markham is also determining better ways to predict the water usage by the fire department, municipal properties, and from watermain flushing. This will give a more accurate percentage of water loss in the distribution system.

Recommendation:

a) It is recommended that the Town of Markham ensure the marker of each entry be clearly identifiable. Also, errors in the logbook should be crossed out with a single line with the individual's identity made known (i.e. initials).

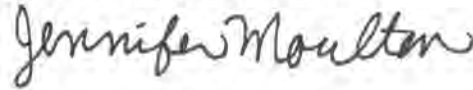
b) It is recommended that the Town of Markham continue in its proactive leak detection program to identify factors contributing to unaccounted water loss.

SIGNATURES

Inspected By:

Jennifer Moulton

Signature: (Provincial Officer):



Reviewed & Approved By:

Marcel Parent

Signature: (Supervisor):



Review & Approval Date:

June 30, 2010

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.

APPENDIX A

DRINKING WATER SYSTEM COMPONENTS DESCRIPTION

DRINKING WATER SYSTEM COMPONENTS DESCRIPTION

Name: Markham Operation Office**Station Id #:****Type:** Other**Sub Type:** Other**Street Number:** 8100**Street Name:** Warden Ave**Lot:****Concession:****Part:****Reference Plan:****Map Datum:** NAD 83**Geo-Referencing Method:** GPS**Accuracy Estimate:** 10-30 Meters (Med Quality GPS)**Location Reference:** Entrance to Object**UTM Zone:** 17**UTM Northing:****UTM Easting:****Latitude:****Longitude:**

Name: Distribution System Sampling Station**Station Id #:** A01**Type:** Other**Sub Type:** Other**Street Number:** 25**Street Name:** Lanark Rd.**Lot:****Concession:****Part:****Reference Plan:****Map Datum:** NAD 83**Geo-Referencing Method:** GPS**Accuracy Estimate:** 1-10 Meters (Good Quality GPS)**Location Reference:** Near Object**UTM Zone:** 17**UTM Northing:** 4856047**UTM Easting:** 631937**Latitude:****Longitude:**

Name: Distribution System Sampling Station**Station Id #:** B01**Type:** Other**Sub Type:** Other**Street Number:** 555**Street Name:** Miller Ave.**Lot:****Concession:****Part:****Reference Plan:**

Map Datum:	NAD 83		
Geo-Referencing Method:	GPS		
Accuracy Estimate:	1-10 Meters (Good Quality GPS)		
Location Reference:	Near Object	UTM Zone:	17
UTM Northing:	4855298	UTM Easting:	632980
Latitude:		Longitude:	

Name: Distribution System Sampling Station
Station Id #: B02
Type: Other
Sub Type: Other

Street Number: 250 **Street Name:** Shields Ct.
Lot: **Concession:**
Part: **Reference Plan:**

Map Datum:	NAD 83		
Geo-Referencing Method:	GPS		
Accuracy Estimate:	1-10 Meters (Good Quality GPS)		
Location Reference:	Near Object	UTM Zone:	17
UTM Northing:	4854498	UTM Easting:	631658
Latitude:		Longitude:	

Name: Distribution System Sampling Station
Station Id #: J02
Type: Other
Sub Type: Other

Street Number: 120 **Street Name:** Carlton Road
Lot: **Concession:**
Part: **Reference Plan:**

Map Datum:	NAD 83		
Geo-Referencing Method:	GPS		
Accuracy Estimate:	1-10 Meters (Good Quality GPS)		
Location Reference:	Near Object	UTM Zone:	17
UTM Northing:	4858911	UTM Easting:	634468
Latitude:		Longitude:	

Name: Distribution System Sampling Station
Station Id #: J07
Type: Other
Sub Type: Other

Street Number:	21	Street Name:	Reeve Dr.	
Lot:		Concession:		
Part:		Reference Plan:		
Map Datum:	NAD 83			
Geo-Referencing Method:	GPS			
Accuracy Estimate:	1-10 Meters (Good Quality GPS)			
Location Reference:	Near Object	UTM Zone:	17	
UTM Northing:	4859174	UTM Easting:	640054	
Latitude:		Longitude:		

Name:	Distribution System Sampling Station
Station Id #:	K01
Type:	Other
Sub Type:	Other

Street Number:	61	Street Name:	Sciberras Rd.	
Lot:		Concession:		
Part:		Reference Plan:		
Map Datum:	NAD 83			
Geo-Referencing Method:	GPS			
Accuracy Estimate:	1-10 Meters (Good Quality GPS)			
Location Reference:	Near Object	UTM Zone:	17	
UTM Northing:	4858194	UTM Easting:	635108	
Latitude:		Longitude:		

Name:	Distribution System Sampling Station
Station Id #:	K04
Type:	Other
Sub Type:	Other

Street Number:	122	Street Name:	Drakefield Rd.	
Lot:		Concession:		
Part:		Reference Plan:		
Map Datum:	NAD 83			
Geo-Referencing Method:	GPS			
Accuracy Estimate:	1-10 Meters (Good Quality GPS)			
Location Reference:	Near Object	UTM Zone:	17	
UTM Northing:	4858435	UTM Easting:	638476	
Latitude:		Longitude:		

Name: Distribution System Sampling Station
Station Id #: K05
Type: Other
Sub Type: Other

Street Number: 90 **Street Name:** Robinson St.

Lot: **Concession:**
Part: **Reference Plan:**

Map Datum: NAD 83
Geo-Referencing Method: GPS
Accuracy Estimate: 1-10 Meters (Good Quality GPS)
Location Reference: Near Object **UTM Zone:** 17
UTM Northing: 4859474 **UTM Easting:** 639133
Latitude: **Longitude:**

APPENDIX B

PERMIT, LICENCE, OR CERTIFICATE OF APPROVAL



MUNICIPAL DRINKING WATER LICENCE

Licence Number: 021-101

Issue Number: 1

Pursuant to the *Safe Drinking Water Act*, 2002, S.O. 2002, c. 32, and the regulations made thereunder and subject to the limitations thereof, this municipal drinking water licence is issued under Part V of the *Safe Drinking Water Act*, 2002, S.O. 2002, c. 32 to:

The Corporation of the Town of Markham

**101 Town Center Blvd.
Markham ON L3R 9W3**

For the following municipal residential drinking water system:

Markham Distribution System

This municipal drinking water licence includes the following:

Schedule	Description
Schedule A	Drinking Water System Information
Schedule B	General Conditions
Schedule C	System-Specific Conditions
Schedule D	Conditions for Relief from Regulatory Requirements

DATED at TORONTO this 14th day of August, 2009

Signature

A handwritten signature in black ink, appearing to read "I. Prashad".

Indra Prashad, P.Eng.
Director
Part V, *Safe Drinking Water Act*, 2002

Schedule A: Drinking Water System Information

System Owner	The Corporation of the Town of Markham
Licence Number	021-101
Drinking Water System Name	Markham Distribution System
Schedule A Issue Date	August 14th, 2009

The following information is applicable to the above drinking water system and forms part of this licence:

Licence

Licence Issue Date	August 14, 2009
Licence Expiry Date	August 13, 2014
Application for Licence Renewal Date	February 11, 2014

Drinking Water Works Permit

Drinking Water System Name	Permit Number	Issue Date
Markham Distribution System	021-201	\${DWWPISSUED}

Permit To Take Water

Water Taking Locations	Permit Number	Issue Date
Not Applicable	Not Applicable	Not Applicable

Financial Plans

The Financial Plan Number for the Financial Plan required to be developed for this drinking water system in accordance with O. Reg. 453/07 shall be:	021-301
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Accredited Operating Authority

Drinking Water System or Operational Subsystems	Accredited Operating Authority	Operational Plan Number
Markham Distribution System	The Corporation of the Town of Markham	021-401

Schedule B: General Conditions

System Owner	The Corporation of the Town of Markham
Licence Number	021-101
Drinking Water System Name	Markham Distribution System
Schedule B Issue Date	August 14th, 2009

1.0 Definitions

1.1 Words and phrases not defined in this licence and the associated drinking water works permit shall be given the same meaning as those set out in the SDWA and any regulations made in accordance with that act, unless the context requires otherwise.

1.2 In this licence and the associated drinking water works permit:

“adverse effect”, **“contaminant”** and **“natural environment”** shall have the same meanings as in the EPA;

“alteration” may include the following in respect of this drinking water system:

- (a) An addition to the system,
- (b) A modification of the system,
- (c) A replacement of part of the system, and
- (d) An extension of the system;

“compound of concern” means a contaminant that, based on generally available information, may be emitted from a component of the drinking water system to the atmosphere in a quantity that is significant either in comparison to the relevant point of impingement limit or if a point of impingement limit is not available for the compound, then based on generally available toxicological information, the compound has the potential to cause an adverse effect as defined by the EPA at a point of impingement;

“Director” means a Director appointed pursuant to section 6 of the SDWA for the purposes of Part V of the SDWA;

“drinking water works permit” means the drinking water works permit for the drinking water system as identified in Schedule A of this licence;

“emission summary table” means the table that was prepared by a Professional Engineer in accordance with O. Reg. 419/05 and the procedure document listing the appropriate point of impingement concentrations of each compound of concern emitted from a component of the drinking water system and providing comparison to the corresponding point of impingement limit;

“EPA” means the *Environmental Protection Act*, R.S.O. 1990, c. E.19;

“financial plan” means the financial plan required by O. Reg. 453/07 and the conditions of this licence;

"licence" means this municipal drinking water licence for the municipal drinking water system identified in Schedule A of this licence;

"operational plan" means an operational plan developed in accordance with the Director's Directions – Minimum Requirements for Operational Plans made under the authority of subsection 15(1) of the SDWA;

"owner" means the owner of the drinking water system as identified in Schedule A of this licence;

"point of impingement" means any point in the natural environment that is not on the same property as the source of the contaminant and as defined by section 2 of O. Reg. 419/05;

"point of impingement limit" means the appropriate standard from Schedule 1, 2 or 3 of O. Reg. 419/05 and if a standard is not provided for a compound of concern, the appropriate criteria listed in the Ministry of the Environment publication titled "Summary of Standards and Guidelines to support Ontario Regulation 419: Air Pollution – Local Air Quality (including Schedule 6 of O. Reg. 419 on Upper Risk Thresholds)", dated February 2008, as amended;

"procedure document" means the Ministry of the Environment procedure titled "Procedure for Preparing an Emission Summary and Dispersion Modelling Report" dated July 2005, as amended;

"Professional Engineer" means a Professional Engineer who has been licenced to practice in the Province of Ontario;

"provincial officer" means a provincial officer appointed pursuant to section 8 of the SDWA;

"publication NPC-205" means the Ministry of the Environment publication titled "Sound Level Limits for Stationary Sources in Class 1 & 2 Areas (Urban)" dated October 1995, as amended;

"publication NPC-207" means the Ministry of the Environment draft technical publication titled "Impulse Vibration in Residential Buildings" dated November 1983, supplementing the Ministry of the Environment "Model Municipal Noise Control By-law, Final Report" dated August 1978;

"publication NPC-232" means the Ministry of the Environment publication titled "Sound Level Limits for Stationary Sources in Class 3 Areas (Rural)" dated October 1995, as amended;

"SDWA" means the *Safe Drinking Water Act*, 2002, S.O. 2002, c. 32;

"sensitive populations" means any one or a combination of the following locations where the health effects of nitrogen oxides emissions from emergency generator(s) shall be considered using the point of impingement limit instead of the Ministry of the Environment screening level for emergency generator(s):

- (a) health care units (e.g., hospitals and nursing homes),
- (b) primary/junior public schools,
- (c) day-care facilities, and
- (d) playgrounds;

2.0 Applicability

- 2.1** In addition to any other requirements, the drinking water system identified above shall be established, altered and operated in accordance with the conditions of the drinking water works permit and this licence.

3.0 Licence Expiry

- 3.1** This licence expires on the date identified as the licence expiry date in Schedule A of this licence.

4.0 Licence Renewal

- 4.1** Any application to renew this licence shall be made on or before the date identified as the application for licence renewal date set out in Schedule A of this licence.

5.0 Compliance

- 5.1** The owner and operating authority shall ensure that any person authorized to carry out work on or to operate any aspect of the drinking water system has been informed of the SDWA, all applicable regulations made in accordance with that act, the drinking water works permit and this licence and shall take all reasonable measures to ensure any such person complies with the same.

6.0 Licence and Drinking Water Works Permit Availability

- 6.1** At least one copy of this licence and the drinking water works permit shall be stored in such a manner that they are readily viewable by all persons involved in the operation of the drinking water system.

7.0 Permit To Take Water (Not Applicable)

8.0 Financial Plan

- 8.1** The owner of the drinking water system, by the later of July 1, 2010 and the date that is six months after the date the first licence for the system is issued, shall prepare and approve financial plans for the system that satisfy the requirements prescribed under section 3 of O. Reg. 453/07.

- 8.2** The owner of the drinking water system shall ensure that every financial plan prepared in accordance with subsections 2 (1) and 3 (1) of O. Reg. 453/07 contains on the front page of the financial plan, the appropriate financial plan number as set out in Schedule A of this licence.

9.0 Interpretation

- 9.1** Where there is a conflict between the provisions of this licence and any other document, the following hierarchy shall be used to determine the provision that takes precedence:
- 9.1.1 The SDWA;
 - 9.1.2 A condition imposed in this licence that explicitly overrides a prescribed regulatory requirement;
 - 9.1.3 A condition imposed in the drinking water works permit that explicitly overrides a prescribed regulatory requirement;
 - 9.1.4 Any regulation made under the SDWA;
 - 9.1.5 Any provision of this licence that does not explicitly override a prescribed regulatory requirement;
 - 9.1.6 Any provision of the drinking water works permit that does not explicitly override a prescribed regulatory requirement;
 - 9.1.7 Any application documents listed in this licence, or the drinking water works permit from the most recent to the earliest; and
 - 9.1.8 All other documents listed in this licence, or the drinking water works permit from the most recent to the earliest.
- 9.2** If any requirement of this licence or the drinking water works permit is found to be invalid by a court of competent jurisdiction, the remaining requirements of this licence and the drinking water works permit shall continue to apply.
- 9.3** The issuance of and compliance with the conditions of this licence and the drinking water works permit does not:
- 9.3.1 Relieve any person of any obligation to comply with any provision of any applicable statute, regulation or other legal requirement, including the *Environmental Assessment Act*, R.S.O. 1990, c. E.18; and
 - 9.3.2 Limit in any way the authority of the appointed Directors and provincial officers of the Ministry of the Environment to require certain steps be taken or to require the owner to furnish any further information related to compliance with the conditions of this licence or the drinking water works permit.
- 9.4** For greater certainty, nothing in this licence or the drinking water works permit shall be read to provide relief from regulatory requirements in accordance with section 46 of the SDWA, except as expressly provided in the licence or the drinking water works permit.

10.0 Adverse Effects

- 10.1** Nothing in this licence or the drinking water works permit shall be read as to permit:
- 10.1.1 The discharge of a contaminant into the natural environment that causes or is likely to cause an adverse effect; or
 - 10.1.2 The discharge of any material of any kind into or in any waters or on any shore or bank thereof or into or in any place that may impair the quality of the water of any waters.
- 10.2** All reasonable steps shall be taken to minimize and ameliorate any adverse effect on the natural environment or impairment of the quality of water of any waters resulting from the operation of the drinking water system including such accelerated or additional monitoring as may be necessary to determine the nature and extent of the effect or impairment.
- 10.3** Fulfillment of one or more conditions imposed by this licence or the drinking water works permit does not eliminate the requirement to fulfill any other condition of this licence or the drinking water works permit.

11.0 Change of Owner or Operating Authority

- 11.1** This licence is not transferable without the prior written consent of the Director.
- 11.2** The owner shall notify the Director in writing of a change of any operating authority identified in Schedule A of this licence.

12.0 Information to be Provided

- 12.1** Any information requested by a Director or a provincial officer concerning the drinking water system and its operation, including but not limited to any records required to be kept by this licence or the drinking water works permit, shall be provided upon request.

13.0 Records Retention

- 13.1** Except as otherwise required in this licence or the drinking water works permit, any records required by or created in accordance with this licence or the drinking water works permit, other than the records specifically subject to the records retention requirements of section 12 of O. Reg. 170/03, shall be retained for at least 5 years and made available for inspection by a provincial officer, upon request.

14.0 Chemicals and Materials

- 14.1** All chemicals and materials used in the alteration or operation of the drinking water system that come into contact with water within the system shall meet all applicable standards set by both the American Water Works Association ("AWWA") and the American National Standards Institute ("ANSI") safety criteria standards NSF/60 and NSF/61.

- 14.2** The most current chemical and material product registration documentation from a testing institution accredited by either the Standards Council of Canada or by the American National Standards Institution ("ANSI") shall be available at all times for each chemical and material used in the operation of the drinking water system that comes into contact with water within the system.
- 14.3** Conditions 14.1 and 14.2 do not apply in the case of the following:
- 14.3.1 Water pipe and pipe fittings meeting AWWA specifications made from ductile iron, cast iron, PVC, fibre and/or steel wire reinforced cement pipe or high density polyethylene (HDPE);
 - 14.3.2 Articles made from stainless steel, glass, HDPE or Teflon®;
 - 14.3.3 Cement mortar for watermain lining and for water contacting surfaces of concrete structures made from washed aggregates and Portland cement;
 - 14.3.4 Food grade oils and lubricants; or
 - 14.3.5 Any particular chemical or material where the owner has written documentation signed by the Director that indicates that the Ministry of the Environment is satisfied that the chemical or material is acceptable for use within the drinking water system and the chemical or material is only used as permitted by the documentation.

15.0 Drawings

- 15.1** All drawings and diagrams in the possession of the owner that show any treatment subsystem as constructed shall be retained by the owner unless the drawings and diagrams are replaced by a revised or updated version showing the subsystem as constructed subsequent to the alteration.
- 15.2** Any alteration to any treatment subsystem shall be incorporated into process flow diagrams, process and instrumentation diagrams, and record drawings and diagrams within one year of the substantial completion of the alteration.
- 15.3** Process flow diagrams and process and instrumentation diagrams for any treatment subsystem shall be kept in a place, or made available in such a manner, that they may be readily viewed by all persons responsible for all or part of the operation of the drinking water system.

16.0 Operations and Maintenance Manual

- 16.1** An up-to-date operations and maintenance manual or manuals shall be maintained and applicable parts of the manual or manuals shall be made available for reference by all persons responsible for all or part of the operation or maintenance of the drinking water system.
- 16.2** The operations and maintenance manual or manuals, shall include at a minimum:
- 16.2.1 The requirements of this licence and associated procedures;

- 16.2.2 The requirements of the drinking water works permit for the drinking water system;
- 16.2.3 Procedures for monitoring and recording the in-process parameters necessary for the control of any treatment subsystem and for assessing the performance of the drinking water system;
- 16.2.4 Procedures for the operation and maintenance of monitoring equipment;
- 16.2.5 Contingency plans and procedures for the provision of adequate equipment and material to deal with emergencies, upset conditions and equipment breakdown;
- 16.2.6 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 respect of the complaint;
- 16.3** Procedures necessary for the operation and maintenance of any alterations to the drinking water system shall be incorporated into the operations and maintenance manual or manuals prior to those alterations coming into operation.
- 16.4** The operations and maintenance manual or manuals referenced in conditions 16.1 to 16.3 shall be prepared by December 1, 2009.

Schedule C: System-Specific Conditions

System Owner	The Corporation of the Town of Markham
Licence Number	021-101
Drinking Water System Name	Markham Distribution System
Schedule C Issue Date	August 14th, 2009

1.0 Additional Sampling, Testing and Monitoring

Drinking Water Health and Non-Health Related Parameters

- 1.1** For a drinking water system or drinking water subsystem identified in column 1 of Tables 1 and 2 and in addition to any other sampling, testing and monitoring that may be required, sampling, testing and monitoring shall be undertaken for a test parameter listed in column 2 at the sampling frequency listed in column 3 and at the monitoring location listed in column 4 of the same row.

Table 1: Drinking Water Health Related Parameters

Column 1 Drinking Water System or Drinking Water Subsystem Name	Column 2 Test Parameter	Column 3 Sampling Frequency	Column 4 Monitoring Location
Not Applicable	Not Applicable	Not Applicable	Not Applicable

Table 2: Drinking Water Non-Health Related Parameters

Column 1 Drinking Water System or Drinking Water Subsystem Name	Column 2 Test Parameter	Column 3 Sampling Frequency	Column 4 Monitoring Location
Not Applicable	Not Applicable	Not Applicable	Not Applicable

Schedule D: Conditions for Relief from Regulatory Requirements

System Owner	The Corporation of the Town of Markham
Licence Number	021-101
Drinking Water System Name	Markham Distribution System
Schedule D Issue Date	August 14th, 2009

1.0 Lead Regulatory Relief

- 1.1** Any relief from regulatory requirements previously authorized by the Director in respect of the drinking water system under section 38 of the SDWA in relation to the sampling, testing or monitoring requirements contained in Schedule 15.1 of O. Reg. 170/03 shall remain in force until such time as Schedule 15.1 of O. Reg. 170/03 is amended after June 1, 2009.



DRINKING WATER WORKS PERMIT

Permit Number: 021-201

Issue Number: 1

Pursuant to the *Safe Drinking Water Act*, 2002, S.O. 2002, c. 32, and the regulations made thereunder and subject to the limitations thereof, this drinking water works permit is issued under Part V of the *Safe Drinking Water Act*, 2002, S.O. 2002, c. 32 to:

The Corporation of the Town of Markham

**101 Town Center Blvd.
Markham ON L3R 9W3**

For the following municipal residential drinking water system:

Markham Distribution System

This drinking water works permit includes the following:

Schedule	Description
Schedule A	Drinking Water System Description
Schedule B	General
Schedule C	All documents issued as Schedule C to this drinking water works permit which authorize alterations to the drinking water system

DATED at TORONTO this 14th day of August, 2009

Signature

A handwritten signature in black ink that reads "A. Ahmed". The signature is written in a cursive style with a horizontal line underneath.

Aziz Ahmed, P.Eng.
Director
Part V, *Safe Drinking Water Act*, 2002

Schedule A: Drinking Water System Description

System Owner	The Corporation of the Town of Markham
Permit Number	021-201
Drinking Water System Name	Markham Distribution System
Schedule A Issue Date	August 14th, 2009

1.0 System Description

- 1.1 The following is a summary description of the works comprising the above drinking water system:

Overview

The **Markham Distribution System** consists of three primary pressure districts and approximately 955 kilometers of watermains and transmission mains.

Raw water from Lake Ontario is treated by the City of Toronto and the Regional Municipality of Peel. Potable water from these systems is transmitted to the Regional Municipality of York which sells it wholesale to local municipalities including the Town of Markham.

Markham Distribution System

Watermains

- 1.2 Watermains within the distribution system comprise:

- 1.2.1 Watermains that have been set out in each document or file identified in column 1 of Table 1.

Table 1: Watermains	
Column 1 Document or File Name	Column 2 Date
Markham WDS map for DWQMS-24X36.pdf	1/22/2009

- 1.2.2 Watermains that have been added, modified, replaced or extended further to the provisions of Schedule C of this drinking water works permit on or after the date identified in column 2 of Table 1 for each document or file identified in column 1.
- 1.2.3 Watermains that have been added, modified, replaced or extended further to an authorization by the Director on or after the date identified in column 2 of Table 1 for each document or file identified in column 1.

Schedule B: General

System Owner	The Corporation of the Town of Markham
Permit Number	021-201
Drinking Water System Name	Markham Distribution System
Schedule B Issue Date	August 14th, 2009

1.0 Applicability

- 1.1 In addition to any other requirements, the drinking water system identified above shall be altered and operated in accordance with the conditions of this drinking water works permit and the licence.
- 1.2 The definitions and conditions of the licence shall also apply to this drinking water works permit.

2.0 Alterations to the Drinking Water System

- 2.1 Any document issued by the Director as a Schedule C to this drinking water works permit shall provide authority to alter the drinking water system in accordance, where applicable, with the conditions of this drinking water works permit and the licence.
- 2.2 All Schedule C documents issued by the Director for the drinking water system shall form part of this drinking water works permit.
- 2.3 All parts of the drinking water system in contact with drinking water which are:
- 2.3.1 Added, modified, replaced, extended; or
- 2.3.2 Taken out of service for inspection, repair or other activities that may lead to contamination,
- shall be disinfected before being put into service in accordance with the provisions of the AWWA C651 – Standard for Disinfecting Water Mains; AWWA C652 – Standard for Disinfection of Water-Storage Facilities; AWWA C653 – Standard for Disinfection of Water Treatment Plants; or an equivalent procedure.
- 2.4 The owner shall notify the Director within thirty (30) days of the placing into service or the completion of any addition, modification, replacement or extension of the drinking water system which had been authorized through:
- 2.4.1 Schedule B to this drinking water works permit which would require an alteration of the description of a drinking water system component described in Schedule A of this drinking water works permit;
- 2.4.2 Any Schedule C to this drinking water works permit respecting works other than watermains; or
- 2.4.3 Any approval issued prior to the issue date of the first drinking water works permit respecting works other than watermains which were not in service at the time of the issuance of the first drinking water works permit.

- 2.5** For greater certainty, the notification requirements set out in condition 2.4 do not apply to any addition, modification, replacement or extension in respect of the drinking water system which:
- 2.5.1 Is exempt from subsection 31(1) of the SDWA by subsection 9.(2) of O. Reg. 170/03;
 - 2.5.2 Constitutes maintenance or repair of the drinking water system; or
 - 2.5.3 Is a watermain authorized by condition 3.1 of Schedule B of this drinking water works permit.
- 2.6** The owner shall notify the legal owner of any part of the drinking water system that is prescribed as a municipal drinking water system by section 2 of O. Reg. 172/03 of the requirements of the licence and this drinking water works permit as applicable to the prescribed system.
- 2.7** For greater certainty, any alteration to the drinking water system made in accordance with this drinking water works permit may only be carried out after other legal obligations have been complied with including those arising from the *Environmental Assessment Act*, *Niagara Escarpment Planning and Development Act*, *Oak Ridges Moraine Conservation Act*, 2001 and *Greenbelt Act*, 2005.

3.0 Watermain Additions, Modifications, Replacements and Extensions

- 3.1** The drinking water system may be altered by adding, modifying, replacing or extending a watermain within the distribution system subject to the following conditions:
- 3.1.1 The design of the watermain addition, modification, replacement or extension:
 - a) Has been prepared by a Professional Engineer;
 - b) Has been designed only to transmit water and has not been designed to treat water;
 - c) Satisfies the design criteria set out in the Ministry of the Environment publication "Watermain Design Criteria for Future Alterations Authorized under a Drinking Water Works Permit – March 2009", as amended from time to time; and
 - d) Is consistent with or otherwise addresses, the design objectives contained within the Ministry of the Environment publication "Design Guidelines for Drinking Water Systems, 2008", as amended from time to time.
 - 3.1.2 The maximum demand for water exerted by consumers who are serviced by the addition, modification, replacement or extension of the watermain will not result in an exceedance of the rated capacity of a treatment subsystem or the maximum flow rate for a treatment subsystem component as specified in the licence, or the creation of adverse conditions within the drinking water system.
 - 3.1.3 The watermain addition, modification, replacement or extension will not adversely affect the distribution system's ability to maintain a minimum pressure of 140 kPa at ground level at all points in the distribution system under maximum day demand plus fire flow conditions.

- 3.1.4 Secondary disinfection will be provided to water within the added, modified, replaced or extended watermain to meet the requirements of O. Reg. 170/03.
- 3.1.5 The watermain addition, modification, replacement or extension is wholly located within the municipal boundary over which the owner has jurisdiction.
- 3.1.6 The owner of the drinking water system consents to the watermain addition, modification, replacement or extension.
- 3.1.7 A Professional Engineer has verified in writing that the watermain addition, modification, replacement or extension meets the requirements of condition 3.1.1.
- 3.1.8 The owner of the drinking water system has verified in writing that the watermain addition, modification, replacement or extension meets the requirements of conditions 3.1.2 to 3.1.6.
- 3.2** The authorization for the addition, modification, replacement or extension of a watermain provided for in condition 3.1 does not include the addition, modification, replacement or extension of a watermain that:
 - 3.2.1 Passes under or through a body of surface water, unless trenchless construction methods are used;
 - 3.2.2 Has a nominal diameter greater than 750 mm;
 - 3.2.3 Connects to another drinking water system; or
 - 3.2.4 Results in the fragmentation of the drinking water system.
- 3.3** The verifications required in conditions 3.1.7 and 3.1.8 shall be:
 - 3.3.1 Recorded on "Form 1 – Record of Watermains Authorized as a Future Alteration" as published by the Ministry of the Environment; and
 - 3.3.2 Retained for a period of ten (10) years by the owner.
- 3.4** For greater certainty, the verification requirements set out in condition 3.3 do not apply to any addition, modification, replacement or extension in respect of the drinking water system which:
 - 3.4.1 Is exempt from subsection 31(1) of the SDWA by subsection 9.(2) of O. Reg. 170/03; or
 - 3.4.2 Constitutes maintenance or repair of the drinking water system.
- 3.5** The document or file referenced in Column 1 of Table 1 of Schedule A of this drinking water works permit that sets out watermains shall be retained by the owner and shall be updated to include watermain additions, modifications, replacements and extensions within 12 months of the addition, modification, replacement or extension.
- 3.6** The updates required by condition 3.5 shall include watermain location relative to named streets or easements and watermain diameter.

4.0 Minor Modifications to the Drinking Water System

- 4.1** The drinking water system may be altered by modifying or replacing the following components:
- 4.1.1 Treatment process or treated water pumps;
 - 4.1.2 Chemical metering or chemical handling pumps;
 - 4.1.3 Valves;
 - 4.1.4 Instrumentation and controls;
 - 4.1.5 Cathodic corrosion protection; or
 - 4.1.6 Spill containment works.
- 4.2** The drinking water system may be altered by replacing the following:
- 4.2.1 Treatment process or treated water piping within the treatment subsystem.
- 4.3** The modification or replacement of a drinking water system component set out in condition 4.1 or the replacement of a drinking water system component set out in condition 4.2 must not result in:
- 4.3.1 An exceedance of a treatment subsystem rated capacity or a treatment subsystem component maximum flow rate as specified in the licence;
 - 4.3.2 The bypassing of any unit process within a treatment subsystem;
 - 4.3.3 A deterioration in the quality of drinking water provided to consumers;
 - 4.3.4 A reduction in the reliability or redundancy of any component of the drinking water system;
 - 4.3.5 An negative impact on the ability to undertake compliance and other monitoring; or
 - 4.3.6 An adverse effect on the environment.
- 4.4** The owner shall verify in writing that the modification or replacement of drinking water system components in accordance with conditions 4.1 and 4.2 has met the requirements of the conditions listed in condition 4.3.
- 4.5** The verifications required in condition 4.4 shall be:
- 4.5.1 Recorded on "Form 2 – Record of Minor Modifications or Replacements to the Drinking Water System" as published by the Ministry of the Environment; and
 - 4.5.2 Retained for a period of ten (10) years by the owner.
- 4.6** For greater certainty, the verification requirements set out in conditions 4.4 and 4.5 do not apply to any modification or replacement in respect of the drinking water system which:

- 4.6.1 Is exempt from subsection 31(1) of the SDWA by subsection 9.(2) of O. Reg. 170/03; or
 - 4.6.2 Constitutes maintenance or repair of the drinking water system.
- 4.7** The owner shall update any drawings maintained for the drinking water system to reflect the modification or replacement of the works, where applicable.

5.0 Equipment with Emissions to the Air

- 5.1** The drinking water system may be altered by adding, modifying or replacing any of the following drinking water system components that may discharge or alter the rate or manner of a discharge of a compound of concern to the atmosphere:
- 5.1.1 Any equipment, apparatus, mechanism or thing that is used for the transfer of outdoor air into a building or structure that is not a cooling tower;
 - 5.1.2 Any equipment, apparatus, mechanism or thing that is used for the transfer of indoor air out of a space used for the production, processing, repair, maintenance or storage of goods or materials, including chemical storage;
 - 5.1.3 Laboratory fume hoods used for drinking water testing, quality control and quality assurance purposes;
 - 5.1.4 Low temperature handling of compounds with a vapor pressure of less than 1 kilopascal;
 - 5.1.5 Maintenance welding stations;
 - 5.1.6 Minor painting operations used for maintenance purposes;
 - 5.1.7 Parts washers for maintenance shops;
 - 5.1.8 Emergency chlorine and ammonia gas scrubbers;
 - 5.1.9 Venting for activated carbon units for drinking water taste and odour control;
 - 5.1.10 Venting for a stripping unit for methane removal from a groundwater supply;
 - 5.1.11 Natural gas or propane fired boilers, water heaters, space heaters and make-up air units with a total facility-wide heat input rating of less than 20 million kilojoules per hour, and with an individual fuel energy input of less than or equal to 10.5 gigajoules per hour; and
 - 5.1.12 Emergency generators that fire No. 2 fuel oil (diesel fuel) with a sulphur content of 0.5 per cent or less measured by weight, natural gas, propane, gasoline or biofuel, and that are used for emergency duty only with periodic testing.
- 5.2** The owner shall not add, modify or replace a drinking water system component set out in condition 5.1 for an activity that is not directly related to the treatment and distribution of drinking water.

- 5.3 The emergency generators identified in condition 5.1.12 shall not be used for non-emergency purposes including the generation of electricity for sale or for peak shaving purposes.
- 5.4 The owner shall prepare an emission summary table for nitrogen oxide emissions only, for each addition, modification or replacement of emergency generators identified in condition 5.1.12.

Performance Limits

- 5.5 The owner shall ensure that a drinking water system component identified in conditions 5.1.1 to 5.1.12 is operated at all times to comply with the following limits:
 - 5.5.1 For equipment other than emergency generators, the maximum concentration of any compound of concern at a point of impingement shall not exceed the corresponding point of impingement limit;
 - 5.5.2 For emergency generators, the maximum concentration of nitrogen oxides at sensitive populations shall not exceed the applicable point of impingement limit, and at non-sensitive populations shall not exceed the Ministry of the Environment half-hourly screening level of 1880 ug/m³ as amended;
 - 5.5.3 The noise emissions comply at all times with the limits set out in publication NPC-205 and/or publication NPC-232, as applicable; and
 - 5.5.4 The vibration emissions comply at all times with the limits set out in publication NPC-207.
- 5.6 The owner shall verify in writing that any addition, modification or replacement of works in accordance with condition 5.1 has met the requirements of the conditions listed in condition 5.5.
- 5.7 The owner shall document how compliance with the performance limits outlined in 5.5.3 and 5.5.4 is being achieved, through noise abatement equipment and/or operational procedures.
- 5.8 The verifications required in condition 5.6 shall be:
 - 5.8.1 Recorded on "Form 3 – Record of Addition, Modification or Replacement of Equipment Discharging a Contaminant of Concern to the Atmosphere" as published by the Ministry of the Environment.
 - 5.8.2 Retained for a period of ten (10) years by the owner.
- 5.9 For greater certainty, the verification requirements set out in conditions 5.6 and 5.8 do not apply to any addition, modification or replacement in respect of the drinking water system which:
 - 5.9.1 Is exempt from subsection 31(1) of the SDWA by subsection 9.(2) of O. Reg. 170/03; or
 - 5.9.2 Constitutes maintenance or repair of the drinking water system.

- 5.10** The owner shall update any drawings maintained for the works to reflect the addition, modification or replacement of the works, where applicable.

6.0 Previously Approved Works

- 6.1** The owner may add, modify, replace or extend, and operate part of a municipal drinking water system if:
- 6.1.1 An approval was issued after January 1, 2004 under section 36 of the SDWA in respect of the addition, modification replacement or extension and operation of that part of the municipal drinking water system;
 - 6.1.2 The approval expired by virtue of subsection 36(4) of the SDWA; and
 - 6.1.3 The addition, modification, replacement or extension commenced within five years of the date that activity was approved by the expired approval.

Form 1 – Record of Watermains Authorized as a Future Alteration
Part 1 – Drinking Water Works Permit Number: _____

(Insert the Drinking Water Works Permit number authorizing the addition, modification, replacement or extension of watermains)
Part 2 – Description of watermain addition, modification, replacement or extension (Use attachments if required)

The description shall include:

- 1) A brief description above of the undertaking (e.g. street name(s); subdivision name; project name); and
- 2) An attachment including a plan view drawing identifying at a minimum:
 - a) location(s) of the undertaking (e.g. showing street names, easements, etc.); and
 - b) nominal diameter of the watermain(s) associated with the addition, modification, replacement or extension.

Part 3 – Verification by Professional Engineer

I hereby verify that I am a Professional Engineer who is licensed to practice in the Province of Ontario and the design of the watermain addition, modification, replacement or extension:

- 1) Has been prepared by a Professional Engineer who is licensed to practice in the Province of Ontario;
- 2) Has been designed only to transmit water and has not been designed to treat water;
- 3) Satisfies the design criteria set out in the Ministry of the Environment publication "Watermain Design Criteria for Future Alterations Authorized under a Drinking Water Works Permit – March 2009", as amended from time to time; and
- 4) Is consistent with or otherwise addresses, the design objectives contained within the Ministry of the Environment publication "Design Guidelines for Drinking Water Systems, 2008", as amended from time to time.

Name: (Print) _____ Signature: _____

PEO Licence Number: _____ Date: _____

Part 4 – Verification by Owner

I hereby verify that:

- 1) The maximum demand for water exerted by consumers who are serviced by the addition, modification, replacement or extension of the watermain will not result in an exceedance of the rated capacity of a treatment subsystem or the maximum flow rate for a treatment subsystem component as specified in the licence, or the creation of adverse conditions within the drinking water system;
- 2) The watermain addition, modification, replacement or extension will not adversely affect the distribution system's ability to maintain a minimum pressure of 140 kPa at ground level at all points in the distribution system under maximum day demand plus fire flow conditions.
- 3) Secondary disinfection will be provided to water within the added, modified, replaced or extended watermain to meet the requirements of O. Reg. 170/03;
- 4) The watermain addition, modification, replacement or extension is wholly located within the municipal boundary over which the owner has jurisdiction;
- 5) The owner consents to the watermain addition, modification, replacement or extension; and
- 6) I am authorized by the owner to complete this verification.

Name of Owner: (Print) _____

Name: (Print) _____ Signature: _____
Owner Representative

Date: _____

Form 2 – Record of Minor Modifications or Replacements to the Drinking Water System**Part 1 – Drinking Water Works Permit Number:** _____*(Insert the Drinking Water Works Permit number authorizing minor modifications or replacements to the Drinking Water System)***Part 2 – Description of Minor Modifications or Replacements (Use attachments if required)**

The description shall include:

- 1) An identification of the system component being modified or replaced;
- 2) The location of the works being modified or replaced; and
- 3) A brief description of the modification or replacement.

Part 3 – Verification by Owner

I hereby verify that:

- 1) The minor modifications or replacements described in Part 2 of this form meets the requirements of the conditions of the Drinking Water Works Permit identified in Part 1 of this form which authorizes the minor modifications or replacements; and
- 2) I am authorized by the owner to complete this verification.

Name of Owner: (Print) _____

Name: (Print) _____
Owner Representative

Signature: _____

Date: _____

**Form 3 – Record of Addition, Modification or Replacement of Equipment
Discharging a Contaminant of Concern to the Atmosphere****Part 1 – Drinking Water Works Permit Number:** _____*(Insert the Drinking Water Works Permit number authorizing the addition, modification or replacement of equipment discharging a contaminant of concern to the atmosphere)***Part 2 – Description of Equipment Added, Modified or Replaced (Use attachments if required)***The description shall include:*

- 1) A brief description of the undertaking; and
- 2) An attachment including a plan view drawing identifying at a minimum the location of the undertaking and the location of the stack or vent discharging to the atmosphere

Part 3 – Verification by Owner

I hereby verify that:

- 1) The addition, modification or replacement of equipment discharging a contaminant of concern to the atmosphere described in Part 2 of this form meets the requirements of the conditions of the Drinking Water Works Permit identified in Part 1 which authorizes the addition, modification or replacement;
- 2) Where required, an Emission Summary Table was prepared by a Professional Engineer who is licensed to practice in the Province of Ontario; and
- 3) I am authorized by the owner to complete this verification.

Name of Owner: (Print) _____

Name: (Print) _____ Signature: _____
Owner Representative

Date: _____

APPENDIX C

MOE AUDIT SAMPLE RESULTS

Login: **C176979**

Program Code 130071401 Program: MOE OPERATIONS DIVISION
Study: WATER, COMMUNAL
Project: CENTRAL REG. - YORK-DURHAM DIS
Activity: WTP MUNIC INSPECT/ADVERS NOTIF
Organization: District Manager York-Durham

Org. Id: 4514

Mail this copy to :

MOULTON, JENN
MOE - YORK-DURHAM DISTRICT OFFICE
230 WESTNEY ROAD SOUTH, 5TH FLOOR
AJAX,ONT
L1S 7J5

Final reports to : MOULTON, JENN
RAPHAEL, PAULINE
SAFEDRINKINGWATERBRANCH.CALENDAR.MOE

Approved by: RUSTY MOODY Manager, Spectroscopy Section
Inquires to: RUSTY MOODY
PETER DROUIN

Approved date: Jun. 21, 2010
Telephone : 416-235-5863
416-235-5850

LOGIN DESCRIPTION: 220004162 MARKHAM DISTRIBUTION SYSTEM JENNIFER MOULTON 905-427-5618

The results relate only to items tested.
To provide customer service feedback on this report and/or other services provided by LaSB, please contact the LaSB HelpDesk at 416-235-6030 or the Customer Service Manager at 416-235-5831.

Login: **C176979**

Field Id JLM-MRKM-01	Station ID 2200041628002	Sample Location Description A01-OPP 25 LANARK RD DISTRIBUTION		Sampling Date 08 JUN 2010	Time 11:13	Zone 5	Sampler Information	
Sample ID C176979-0001		Sample Comment Description						
MOE*LIMS Products Requested:								
WD	E3144B	VOL3144	WD	E3226A	PA3226	WD	E3473	PB3473

Field Id JLM-MRKM-02	Station ID 2200041628002	Sample Location Description B01-555 MILLER AVE. DISTRIBUTION		Sampling Date 08 JUN 2010	Time 10:32	Zone 5	Sampler Information
Sample ID C176979-0002		Sample Comment Description					
MOE*LIMS Products Requested:							
WD	E3226A	PA3226					

Field Id JLM-MRKM-03	Station ID 2200041628002	Sample Location Description B02-250 SHIELDS COURT DISTRIBUTION		Sampling Date 08 JUN 2010	Time 11:00	Zone 5	Sampler Information
Sample ID C176979-0003		Sample Comment Description					
MOE*LIMS Products Requested:							
WD	E3226A	PA3226					

Field Id JLM-MRKM-04	Station ID 2200041628002	Sample Location Description J02-120 CARLTON RD DISTRIBUTION		Sampling Date 08 JUN 2010	Time 10:46	Zone 5	Sampler Information
Sample ID C176979-0004		Sample Comment Description					
MOE*LIMS Products Requested:							
WD	E3226A	PA3226					

Field Id JLM-MRKM-05	Station ID 2200041628002	Sample Location Description J07-21 REEVE DR. OPP DISTRIBUTION		Sampling Date 08 JUN 2010	Time 08:33	Zone 5	Sampler Information
Sample ID C176979-0005		Sample Comment Description					
MOE*LIMS Products Requested:							
WD	E3226A	PA3226					

Login: **C176979**

Field Id JLM-MRKM-06	Station ID 2200041628002	Sample Location Description K01-61 SCIBERRAS RD. OPP DISTRIBUTION	Sampling Date 08 JUN 2010	Time 09:21	Zone 5	Sampler Information
Sample ID C176979-0006		Sample Comment Description				
MOE*LIMS Products Requested:						
WD	E3226A	PA3226				

Field Id JLM-MRKM-07	Station ID 2200041628002	Sample Location Description K04-122 DRAKEFIELD RD. DISTRIBUTION	Sampling Date 08 JUN 2010	Time 09:05	Zone 5	Sampler Information
Sample ID C176979-0007		Sample Comment Description				
MOE*LIMS Products Requested:						
WD	E3226A	PA3226				

Field Id JLM-MRKM-08	Station ID 2200041628002	Sample Location Description K05-90 ROBINSON ST DISTRIBUTION	Sampling Date 08 JUN 2010	Time 08:48	Zone 5	Sampler Information
Sample ID C176979-0008		Sample Comment Description				
MOE*LIMS Products Requested:						
WD	E3226A	PA3226				

Login: **C176979**

Field ID: Sample ID: MOE*LIMS ID: Station ID: Collect Date: Sample Location Description:		JLM-MRKM-01 C176979-0001 2010WD23-00061 2200041628002 08 JUN 2010 A01-OPP 25 LANARK RD DISTRIBUTION				JLM-MRKM-02 C176979-0002 2010WD23-00062 2200041628002 08 JUN 2010 B01-555 MILLER AVE. DISTRIBUTION				JLM-MRKM-03 C176979-0003 2010WD23-00063 2200041628002 08 JUN 2010 B02-250 SHIELDS COURT DISTRIBUTION			
Sample Comments Description:													
Listid	Parmname	Value	Units	Qual	Rmk1	Value	Units	Qual	Rmk1	Value	Units	Qual	Rmk1
3144L1	Chloroethene	.05	ug/L	<=W									
	1,1-dichloroethene	.05	ug/L	<=W									
	Dichloromethane	.2	ug/L	<=W									
	Tert-butyl methyl ether	.05	ug/L	<=W									
	trans-1,2-dichloroethene	.05	ug/L	<=W									
	Diisopropylether	.05	ug/L	<=W									
	1,1-dichloroethane	.05	ug/L	<=W									
	cis-1,2-dichloroethene	.05	ug/L	<=W									
	Chloroform	4.8	ug/L										
	1,1,1-trichloroethane	.05	ug/L	<=W									
	Carbon tetrachloride	.2	ug/L	<=W									
	1,2-dichloroethane	.05	ug/L	<=W									
	Benzene	.05	ug/L	<=W									
	Trichloroethene	.05	ug/L	<=W									
	1,2-dichloropropane	.05	ug/L	<=W									
	Bromodichloromethane	4.6	ug/L										
	Dichloroacetonitrile	0.5	ug/L	<T									
	Toluene	.05	ug/L	<=W									
	1,1,2-trichloroethane	.1	ug/L	<=W									
	Tetrachloroethene	.05	ug/L	<=W									
	Dibromochloromethane	3.0	ug/L										
	1,2-dibromoethane	.1	ug/L	<=W									
	Chlorobenzene	.05	ug/L	<=W									
	Ethylbenzene	.05	ug/L	<=W									
	m- and p-xylene	.05	ug/L	<=W									
	o-xylene	.05	ug/L	<=W									
	Styrene	.05	ug/L	<=W									
Bromoform	.5	ug/L	<=W										
1,1,2,2-tetrachloroethane	.2	ug/L	<=W										
1,3-dichlorobenzene	.05	ug/L	<=W										
1,4-dichlorobenzene	.05	ug/L	<=W										
1,2-dichlorobenzene	.05	ug/L	<=W										
Trihalomethanes; total	12.5	ug/L											
3226L1	NT: Total Coliforms	See Non-Target Textual result				See Non-Target Textual result				See Non-Target Textual result			
3473L3	Lead	.5	ug/L	+/-0.16									

Login: **C176979**

Field ID:		JLM-MRKM-04				JLM-MRKM-05				JLM-MRKM-06			
Sample ID:		C176979-0004				C176979-0005				C176979-0006			
MOE*LIMS ID:		2010WD23-00064				2010WD23-00065				2010WD23-00066			
Station ID:		2200041628002				2200041628002				2200041628002			
Collect Date:		08 JUN 2010				08 JUN 2010				08 JUN 2010			
Sample Location Description:		J02-120 CARLTON RD DISTRIBUTION				J07-21 REEVE DR. OPP DISTRIBUTION				K01-61 SCIBERRAS RD. OPP DISTRIBUTION			
Sample Comments Description:													
Listid	Parmname	Value	Units	Qual	Rmk1	Value	Units	Qual	Rmk1	Value	Units	Qual	Rmk1
3226L1	NT: Total Coliforms	See Non-Target Textual result				See Non-Target Textual result				See Non-Target Textual result			

Login: **C176979**

Field ID:		JLM-MRKM-07				JLM-MRKM-08			
Sample ID:		C176979-0007				C176979-0008			
MOE*LIMS ID:		2010WD23-00067				2010WD23-00068			
Station ID:		2200041628002				2200041628002			
Collect Date:		08 JUN 2010				08 JUN 2010			
Sample Location Description:		K04-122 DRAKEFIELD RD. DISTRIBUTION				K05-90 ROBINSON ST DISTRIBUTION			
Sample Comments Description:									
Listid	Parmname	Value	Units	Qual	Rmk1	Value	Units	Qual	Rmk1
3226L1	NT: Total Coliforms	See Non-Target Textual result				See Non-Target Textual result			

Login: **C176979**

CODE	DESCRIPTION
NDAT	NO DATA: ABSENT NT: TOTAL COLIFORMS
NDDN	NO DATA: NOT DETECTED NT: DETERIORATION INDICATORS
<T	A MEASURABLE TRACE AMOUNT:INTERPRET WITH CAUTION
<=W	NO MEASURABLE RESPONSE (ZERO): <REPORTED VALUE
NDAE	NO DATA: ABSENT NT: ESCHERICHIA COLI

NON-TARGET TEXTUAL RESULT

Sample ID: C176979-0001	Listid : 3226L1	Parmname : NT: Total Coliforms	Value:	Units: c/100mL	Qual: NDAT	Remarks:
Absent						
Sample ID: C176979-0001	Listid : 3226L1	Parmname : NT: Escherichia coli	Value:	Units: c/100mL	Qual: NDAE	Remarks:
Absent						
Sample ID: C176979-0001	Listid : 3226L1	Parmname : NT: Deterioration Indicators	Value:	Units: c/100mL	Qual: NDDN	Remarks:
Not Detected						
Sample ID: C176979-0002	Listid : 3226L1	Parmname : NT: Total Coliforms	Value:	Units: c/100mL	Qual: NDAT	Remarks:
Absent						
Sample ID: C176979-0002	Listid : 3226L1	Parmname : NT: Escherichia coli	Value:	Units: c/100mL	Qual: NDAE	Remarks:
Absent						
Sample ID: C176979-0002	Listid : 3226L1	Parmname : NT: Deterioration Indicators	Value:	Units: c/100mL	Qual: NDDN	Remarks:
Not Detected						
Sample ID: C176979-0003	Listid : 3226L1	Parmname : NT: Total Coliforms	Value:	Units: c/100mL	Qual: NDAT	Remarks:
Absent						
Sample ID: C176979-0003	Listid : 3226L1	Parmname : NT: Escherichia coli	Value:	Units: c/100mL	Qual: NDAE	Remarks:
Absent						
Sample ID: C176979-0003	Listid : 3226L1	Parmname : NT: Deterioration Indicators	Value:	Units: c/100mL	Qual: NDDN	Remarks:
Not Detected						
Sample ID: C176979-0004	Listid : 3226L1	Parmname : NT: Total Coliforms	Value:	Units: c/100mL	Qual: NDAT	Remarks:

Login: **C176979**

NON-TARGET TEXTUAL RESULT

Absent						
Sample ID: C176979-0004	Listid : 3226L1	Parmname : NT: Escherichia coli	Value:	Units: c/100mL	Qual: NDAE	Remarks:
Absent						
Sample ID: C176979-0004	Listid : 3226L1	Parmname : NT: Deterioration Indicators	Value:	Units: c/100mL	Qual: NDDN	Remarks:
Not Detected						
Sample ID: C176979-0005	Listid : 3226L1	Parmname : NT: Total Coliforms	Value:	Units: c/100mL	Qual: NDAT	Remarks:
Absent						
Sample ID: C176979-0005	Listid : 3226L1	Parmname : NT: Escherichia coli	Value:	Units: c/100mL	Qual: NDAE	Remarks:
Absent						
Sample ID: C176979-0005	Listid : 3226L1	Parmname : NT: Deterioration Indicators	Value:	Units: c/100mL	Qual: NDDN	Remarks:
Not Detected						
Sample ID: C176979-0006	Listid : 3226L1	Parmname : NT: Total Coliforms	Value:	Units: c/100mL	Qual: NDAT	Remarks:
Absent						
Sample ID: C176979-0006	Listid : 3226L1	Parmname : NT: Escherichia coli	Value:	Units: c/100mL	Qual: NDAE	Remarks:
Absent						
Sample ID: C176979-0006	Listid : 3226L1	Parmname : NT: Deterioration Indicators	Value:	Units: c/100mL	Qual: NDDN	Remarks:
Not Detected						
Sample ID: C176979-0007	Listid : 3226L1	Parmname : NT: Total Coliforms	Value:	Units: c/100mL	Qual: NDAT	Remarks:
Absent						
Sample ID: C176979-0007	Listid : 3226L1	Parmname : NT: Escherichia coli	Value:	Units: c/100mL	Qual: NDAE	Remarks:
Absent						

Login: **C176979**

NON-TARGET TEXTUAL RESULT

Sample ID: C176979-0007	Listid : 3226L1	Parmname : NT: Deterioration Indicators	Value:	Units: c/100mL	Qual: NDDN	Remarks:
Not Detected						
Sample ID: C176979-0008	Listid : 3226L1	Parmname : NT: Total Coliforms	Value:	Units: c/100mL	Qual: NDAT	Remarks:
Absent						
Sample ID: C176979-0008	Listid : 3226L1	Parmname : NT: Escherichia coli	Value:	Units: c/100mL	Qual: NDAE	Remarks:
Absent						
Sample ID: C176979-0008	Listid : 3226L1	Parmname : NT: Deterioration Indicators	Value:	Units: c/100mL	Qual: NDDN	Remarks:
Not Detected						

TEXT COMMENTS

Product Completion

Sample ID	Matrix	Method	Product	Analytical Department	Completion Date	By
C176979-0001	WD	E3144B	VOL3144	4410	15-JUN-10	SALEMIRO
C176979-0001	WD	E3226A	PA3226	6510	11-JUN-10	HAINEKA
C176979-0001	WD	E3473	PB3473	6410	10-JUN-10	MOODYRU
C176979-0002	WD	E3226A	PA3226	6510	11-JUN-10	HAINEKA
C176979-0003	WD	E3226A	PA3226	6510	11-JUN-10	HAINEKA
C176979-0004	WD	E3226A	PA3226	6510	11-JUN-10	HAINEKA
C176979-0005	WD	E3226A	PA3226	6510	11-JUN-10	HAINEKA
C176979-0006	WD	E3226A	PA3226	6510	11-JUN-10	HAINEKA
C176979-0007	WD	E3226A	PA3226	6510	11-JUN-10	HAINEKA
C176979-0008	WD	E3226A	PA3226	6510	11-JUN-10	HAINEKA

*** End of Report ***

APPENDIX D

INSPECTION RATING REPORT

Ministry of the Environment - Inspection Summary Rating Record (Reporting Year - 2010-2011)

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

Regulation: O.REG 170/03
 Category: Large Municipal Residential System
 Type Of Inspection: Standalone
 Inspection Date: May 18, 2010
 Ministry Office: York-Durham District

Maximum Question Rating: 455

Inspection Module	Non-Compliance Rating
Treatment Processes	0 / 39
Distribution System	0 / 25
Operations Manuals	0 / 42
Logbooks	0 / 42
Contingency/Emergency Planning	0 / 15
Consumer Relations	0 / 16
Certification and Training	0 / 51
Water Quality Monitoring	0 / 130
Reporting & Corrective Actions	21 / 87
Other Inspection Findings	0 / 8
TOTAL	21 / 455

Inspection Risk Rating	4.62%
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FINAL INSPECTION RATING:	95.38%
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Ministry of the Environment - Detailed Inspection Rating Record (Reporting Year - 2010-2011)

DWS Name:	MARKHAM DISTRIBUTION SYSTEM
DWS Number:	220004162
DWS Owner:	Markham, The Town Of
Municipal Location:	Markham
Regulation:	O.REG 170/03
Category:	Large Municipal Residential System
Type Of Inspection:	Standalone
Inspection Date:	May 18, 2010
Ministry Office:	York-Durham District

Non-compliant Question(s)	Question Rating
Reporting & Corrective Actions	
Were all required verbal notifications of adverse water quality incidents immediately provided as per O.Reg. 170/03 16-6?	21
TOTAL QUESTION RATING	21

Maximum Question Rating: 455

Inspection Risk Rating	4.62%
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FINAL INSPECTION RATING:	95.38%
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