Clause 2 in Report No. 6 of Committee of the Whole was adopted, without amendment, by the Council of The Regional Municipality of York at its meeting held on March 26, 2015.

2

2014 Annual Drinking Water System Summary Report

Committee of the Whole recommends:

1. Receipt of the presentation by Brett Bloxam, Director of Operations, Maintenance and Monitoring and David Szeptycki, Head of Strategy, Liaison and Policy Implementation, Environmental Services regarding "Delivering Operational Excellence for Water and Wastewater Services".

2. Adoption of the following recommendations, as amended, contained in the report dated October 22, 2014 from the Commissioner of Environmental Services:

    1. The Regional Clerk circulate this report to the Clerks of the local municipalities.

    2. Staff forward a letter to the Ministry of the Environment and Climate Change requesting a shorter turn-around time when providing drinking water reports, and the reporting schedule be changed to the calendar year rather than the provincial fiscal period.

1. Recommendations

It is recommended that:

1. The Regional Clerk circulate this report to the Clerks of the local municipalities.

2. Purpose

York Region's 2014 Annual Drinking Water System Summary Council report and associated attachments fulfill reporting requirements of the Drinking Water Systems regulation and supports Council members with meeting statutory Standard of Care requirements in the *Safe Drinking Water Act, 2002*.

3. Background

Legislation mandates system owners report annually on drinking water systems to Council and the public

All municipal drinking water systems are mandated to report drinking water quality and quantity information under Schedule 22 and Section 11 of the Drinking Water Systems regulation (O. Reg. 170/03) under the *Safe Drinking Water Act, 2002*.

Schedule 22 requires York Region to submit a Drinking Water System Summary Report that summarizes information on annual compliance and capacity of its drinking water systems. This information must be provided to Council no later than March 31 of each year for the preceding calendar year. Section 11 requires York Region to prepare an Annual Water Quality Report to be made available to the public no later than February 28 of each year for the preceding calendar year. York Region staff posted the Section 11 report online at www.york.ca/drinkingwater and provided copies to each of the nine local municipalities prior to the February 28 deadline. Information contained in these reports includes water quality sampling and testing results, in accordance with regulatory requirements allowing residents and businesses to review water quality testing data.

Summary Report provides Council with information required to exercise due diligence and meet Standard of Care requirements for York Region's drinking water systems

Municipal Councillors have an important role to play in ensuring York Region drinking water systems provide safe, high quality drinking water. As a result of the Walkerton incident in which seven people died and thousands became ill from contaminated water, the Province developed the *Safe Drinking Water Act, 2002* to reduce the chance of a similar incident occurring. Section 19 of the *Act* clarifies the legal responsibility held by people with decision-making authority over municipal drinking water systems by outlining a statutory Standard of Care. The *Act* specifically requires these individuals to exercise a level of care, diligence and skill with regard to a municipal drinking water system that a reasonably prudent person would be expected to exercise in a similar situation.

This report summarizes water quality and capacity results for 2014. In addition, this report describes major drinking water system expenses incurred, identifies any instances where sample results did not meet Ontario Drinking Water Quality Standards and summarizes corrective actions taken. As part of this report, staff have provided Attachment 1 – 2014 Drinking Water System Summary Report, which outlines raw water descriptions and treatment methods for individual water systems. It also outlines how York Region uses a multi-barrier approach to help

keep drinking water clean and safe. Combined, these reports help Council members meet their Standard of Care requirements.

Role of Medical Officer of Health oversight on drinking water strengthened post-Walkerton

Based on the Walkerton tragedy, Justice O'Connor recommended that the local Medical Officers of Health play a key role in ensuring drinking water is safe. To reinforce their role, the Province included notification provisions under the *Safe Drinking Water Act, 2002.* This requires owners and operating authorities of drinking water systems and laboratories analyzing drinking water samples to notify the Ministry of the Environment and Climate Change and the Medical officer of Health of adverse results.

The Medical Officer of Health assesses any potential health impact from an adverse water quality result and, where necessary, may direct the owner or operating authority of a drinking water system to take corrective actions beyond what is prescribed by the regulations. In the event of a water emergency, there will be close cooperation between the local Medical Officer of Health, the operating authority, and the Ministry of the Environment and Climate Change to allow for effective communication with the public to protect public health.

Integrated Management System helps mitigate risks associated with providing drinking water

Under the *Safe Drinking Water Act, 2002*, all water systems in Ontario must have a Drinking Water Quality Management Standard (DWQMS) in place. The Standard was a recommendation from the Walkerton Inquiry designed to protect public health by achieving consistent practices in managing and operating water systems. York Region has a long history of applying management systems to support a continuous improvement philosophy using plan-do-check-act approaches to support regulatory excellence which predates the *Safe Drinking Water Act, 2002*. York Region received International Organization for Standardization (ISO) 9001 registration in 2001 for drinking water systems. This registration assists York Region in meeting the needs of customers and other stakeholders, while continually monitoring and improving quality.

York Region's Integrated Management System helps meet requirements of both these management systems. This system helps York Region reduce risks by minimizing operational impacts on the environment, complying with applicable laws, regulations and other environmental requirements, and continually evaluating program delivery. Rigorous and comprehensive evaluation features are built into the system, such as the audit program and management review process; this approach demonstrates accountability and commitment to ongoing program review and improvement of the Department's service delivery. It also supports requirements to report incidents to applicable regulatory agencies,

including the Ministry of the Environment and Climate Change and the Medical Officer of Health. The 2014 Integrated Management System Report (also on this agenda) provides detailed insight into this system and how it helps York Region provide safe drinking water.

4. Analysis and Options

York Region ranked first in the Greater Toronto Area in the Ontario Chief Drinking Water Inspector's Annual Report 2012-2013

Ontario's Chief Drinking Water Inspector releases an annual report rating for drinking water systems. Reporting timelines are based on the Province's previous fiscal year April 1, 2012 to March 31, 2013.

For the Chief Drinking Water Inspector's Annual Report 2012-2013, York Region achieved a compliance score on Ministry of the Environment and Climate Change inspections of 100 per cent and a score of 100 per cent on samples meeting provincial water quality standards as shown in Table 1. City of Toronto and Peel Region, who provide drinking water to York Region, also received high scores in the Chief Drinking Water Inspector's Annual Report. City of Toronto received a 98.38 per cent inspection rating while Peel Region received a score of 99.35 per cent. City of Toronto met water quality standards for 99.91 per cent of tests while Peel Region met standards for 99.96 per cent.
York Region's commitment to continuous improvement has contributed to the Region's top ranking in the Chief Drinking Water Inspector's Annual Report 2012-2013. Individual drinking water system performance summaries can be found in Attachment 1 – 2014 Drinking Water System Summary Report.

Table 1
Ministry of Environment and Climate Change Inspection Ratings for Five Greater Toronto Area Municipalities

Municipality	2011-12 Inspection Rating (%*)	2012-13 Inspection Rating (%*)	2011-12 Drinking Water Quality (% Tests Meeting Standards)*	2012-13 Drinking Water Quality (% Tests Meeting Standards)*
York Region	100.00	100.00	100.00	100.00
Durham	99.83	100.00	99.90	99.96
Halton	98.78	100.00	99.95	99.99
Peel	99.59	99.35	99.97	99.96
Toronto	99.42	98.38	99.89	99.91

*Note: Average scores for all systems within regional jurisdiction.

York Region's drinking water systems operated within the monthly average flow, maximum daily withdrawal, and allowable daily withdrawal limits set out in the Permits to Take Water in 2014

York Region continues to maintain compliance with terms and conditions of its Permits to Take Water. York Region has secured sufficient drinking water capacity for the Region's growing population. In 2014, all of York Region's drinking water systems operated within the monthly average flow, maximum daily withdrawal, and allowable daily withdrawal limits set out in Permits to Take Water issued by the Ministry of the Environment and Climate Change. Maximum permitted volumes in these long-term agreements have been set to allow increased annual quantities required to service forecasted population growth to 2031 and beyond.

York Region operates a range of treatment methods to meet the unique needs of each water system. Descriptions of water supplies and treatment methods, quantity of water provided and available capacity for each water system can be found in Attachment 1 – 2014 Drinking Water System Summary Report. Drinking water systems in York Region are highly interconnected and treatment includes contingencies to mitigate drinking water quality risks.

York Region compliance efforts focus on reducing potential risks to drinking water quality

As part of reporting requirements under the *Safe Drinking Water Act*, *2002* the Region must note any known incidents of non-compliance with the Act, its regulations, approval, drinking water works permit or municipal drinking water license for the reporting period and describe related corrective actions taken. York Region's Integrated Management System provides a framework to support the identification and correction of adverse results or operational events identified and subsequently reported to applicable regulatory agencies, including the Ministry of the Environment and Climate Change and the Medical Officer of Health.

In 2014, York Region complied with the terms and conditions of all drinking water system approvals, licenses, and Permits to Take Water, with the exception of the following incidents highlighted in the sections below and also detailed in Attachment 2 (summary of water sampling results), Attachment 3 (summary of system performance results) and Attachment 4 (summary of results from 2014 Ministry of the Environment and Climate Change inspections). None of these incidents represented a risk to public health and corrective actions have since been instituted.

99.96 per cent of tests performed in 2014 required no corrective action

York Region conducts a comprehensive sampling program that exceeds regulatory requirements. In 2014, 36,817 tests were performed to measure water quality. A total of 13 adverse events, representing 0.04 per cent of tests performed in 2014, are summarized with respective corrective actions in Attachment 2. Most of the adverse results are sodium related as outlined in Table 2. Sodium levels measured in these instances were not significantly above the reporting threshold and do not pose a risk to public health but are reported to help those on low sodium diets effectively manage and monitor their sodium intake. When adverse results were identified for coliforms and nitrates, resamples were taken and results fell well within regulated levels.

Table 2
Summary of 2014 Reported Adverse Water Quality Parameter Results

Parameter	Number of Events
Sodium	11
Coliforms	1
Nitrate	1

Water systems designed to track and lock-out in the event of any potential issues

In addition to the sampling program, continuous monitoring of some parameters, including chlorine residual, is performed. There were 10 system performance events in 2014 related to continuous monitoring that are outlined with respective corrective actions in Attachment 3. Adverse conditions do not indicate a danger to public health but indicate that a parameter has fallen outside of a regulated operating range.

Five of these adverse events were related to chlorine, two of which were due to chlorine analyzer malfunctions. These adverse events had no impact on human health and safety because automated monitoring systems detected the situation and shut down production at these wells until staff arrived on site to initiate corrective actions. Other adverse events related to fluoride were addressed by implementing an operational change to prevent future occurrences. Fluoride is added to drinking water to promote healthy teeth as prescribed by the Medical Officer of Health. For the contact time adverse, the system was switched off until proper disinfection rates could be restored. When an adverse was identified for turbidity resamples were taken, results fell well within regulated levels.

Staff were provided additional training on the root cause of these incidents. York Region's drinking water systems are designed to track and lock-out in the event of any potential issues to prevent risks to public health and safety. A brief overview of adverse system events is provided in Table 3.

Table 3
Summary of 2014 Reported Adverse System Performance Events

Parameter	Number of Events
Chlorine	5
Fluoride	2
Contact Time	1
Turbidity	1
System Pressure	1

No incidents represented a risk to public health and safety

York Region is required to report all adverse incidents to the Ministry of the Environment and Climate Change and the Ministry of Health whenever a prescribed adverse incident is discovered. None of these incidents represented a risk to public health and safety. As outlined above, adverse incidents reported in 2014 were isolated occurrences; none of these events were systemic issues. These events led to additional training and other system improvements such as detailed process flow mapping to help prevent reoccurrence in the future.

One scheduled sample was missed due to complications with prolonged facility shutdown

In March 2014, the Keswick water treatment plant was shut down for three weeks for scheduled maintenance. During scheduled maintenance work, asbestos was discovered, which required the plant to be shut down for approximately 12 weeks for remediation. At no time was there any risk of asbestos entering the drinking water system. While shut down, all scheduled sampling was deferred as no water was distributed from the facility during this time. As a result, required annual inorganic sampling (barium, boron, mercury, and uranium) did not occur in 2014 for the Keswick water treatment plant. In early, 2015 staff discovered the missed 2014 sample and immediately collected samples for analysis; results fell well within the normal range. Historical trending of inorganic parameters at the facility are consistently less than half of the regulated limit. Based on the consistent historical sample results for this facility and the duration of time the facility was shut down, this did not represent a risk to public health and safety.

York Region received approval to use continuous monitoring for turbidity and chlorine

In consultation with the Ministry, staff applied and received approval to use continuous monitoring results for treated water turbidity instead of a single, monthly raw water turbidity sample. Continuous monitoring of treated water provides a more representative indication of drinking water quality. In addition, a start up period for primary disinfection has been granted. Continuous monitoring ensures the system automatically shuts down when proper disinfection has not been achieved at any time.

Ministry of the Environment and Climate Change inspections resulted in high overall inspection ratings

In addition to self-monitoring and auditing performed by York Region, Ministry of the Environment and Climate Change performs inspections of York Region drinking water facilities. Inspection ratings reported in this section are for the previous calendar year, January 1, 2014 to December 31, 2014. Ontario's Chief Drinking Water Inspector reports based on the Province's previous fiscal year April 1, 2012 to March 31, 2013, which differs from the inspections outlined here and in Attachment 4.

In 2014, Ministry of the Environment and Climate Change performed 15 inspections, which resulted in seven non-compliance incidents and eight best practice recommendations. Several of the non-compliance and best practice recommendations resulted from system operating practices, which staff immediately reviewed and implemented corrective actions. Non-compliances related to administrative reporting issues have been addressed through additional operator training. Attachment 4 provides a breakdown of each inspection, any non-compliances or best practices found, and the corrective actions taken. Several of these issues have been addressed by the use of continuous monitoring results rather than intermittent sampling as outlined above.

Link to key Council-approved plans

York Region's Annual Drinking Water System Summary Report provides Council with an overview of York Region's drinking water systems status, capacity, and quality for the year. Drinking water inspection and sampling results consistently demonstrate that York Region is a municipal leader in providing clean, safe drinking water to its residents.

York Region's drinking water system's capabilities and quality align with the Region's 2015 to 2019 Strategic Plan objective of optimizing critical infrastructure system capacity and making it easier to access Regional information and services.

5. Financial Implications

Drinking Water Quality Management Standard financial plan updated in 2014 helps ensure sustainable financial management of drinking water system

Municipal drinking water licenses are valid for five years; however, the *Safe Drinking Water Act*, 2002 requires an expiry date and renewal application deadline to be included in every license. To ensure that a license remains valid, municipalities are required to submit a renewal application on or before the date listed in Schedule A of their license; for York Region this date was July 29, 2014. Council approved the updated financial plan in May 2014, and it was submitted to Ministry of the Environment and Climate Change and Ministry of Municipal Affairs and Housing two months ahead of schedule. As prescribed by Ontario Regulation 453/07, staff issued a notice regarding the availability of the Water Financial Plan, in the local media and on the Region's website.

York Region spent $10.4 million in 2014 to maintain and improve drinking water systems

York Region delivers high quality drinking water in a safe and efficient manner. Effective asset management, including infrastructure maintenance, is critical to the Region's ability to deliver services that are safe, reliable and efficient, while sustaining our growing communities. In 2014, Environmental Services established an Infrastructure and Asset Management branch to provide a heightened focus on this aspect of the system.

In 2014, York Region spent approximately $10.4 million installing, repairing or replacing equipment used to treat, store and deliver safe drinking water, a description of these expenses is included in Table 4. These funds are a component of the overall Environmental Services water budget as approved annually by Council.

Table 4
Summary of Major Expenditures for the Drinking Water System in 2014

Drinking Water System	Repair or Replacement Activity	Expenditures
Ansnorveldt	Pumping station maintenance and repairs	$12,974
Ballantrae/Mussleman's Lake	Elevated tank upgrades	$44,659
Georgina Drinking Water	Keswick Water Treatment Plant	$1,900,579

Drinking Water System	Repair or Replacement Activity	Expenditures
System – Keswick	upgrades and asbestos abatement	
Georgina Drinking Water System – Sutton	Reservoir upgrades	$1,172,205
Mount Albert	Elevated tank upgrades	$11,907
Nobleton	Elevated tank upgrades and recoating	$1,844,131
Schomberg	Elevated tank upgrades	$91,101
York Drinking Water System – Aurora	Watermain replacements Reservoir upgrades	$1,226,085
York Drinking Water System – Holland Landing	Elevated tank upgrades and recoating	$481,582
York Drinking Water System – King City	Well repairs and maintenance	$303,686
York Drinking Water System – Kleinburg	Well upgrades	$126,789
York Drinking Water System – Newmarket	Elevated tank upgrades and recoating	$725,827
York Drinking Water System – Queensville	Well repairs and maintenance	$40,587
York Drinking Water System – Stouffville	Elevated tank upgrades	$129,172
York Drinking Water System	Pumping station upgrades Transmission main repairs	$2,299,310
Total		**$10,410,554**

6. Local Municipal Impact

York Region's drinking water systems are operated to meet applicable regulatory compliance requirements prescribed through applicable legislation. Meeting these regulatory requirements assists the Region in delivery of safe and sustainable supply of drinking water to the nine local municipalities.

York Region owns approximately nine per cent of linear assets in the total water distribution system while local municipalities own the remainder of the system. Collaboration is a key factor to ensure that drinking water quality is maintained.

York Region and local municipal staff have been working together to establish best management practices for enhanced maintenance of the water distribution system to further ensure quality standards are maintained.

Copies of Section 11 regulatory reports were provided to local municipalities to meet the February 28 deadline. Copies of this report and attachments will also be provided to local municipal staff upon approval by Council.

7. Conclusion

This council report (including all attachments) along with Section 11 forms (posted on www.york.ca/drinkingwater) satisfies reporting requirements under the *Safe Drinking Water Act, 2002*, namely Schedule 22 and Section 11 of O. Reg. 170/03. This council report and attachments also provides the detailed information on the Region's drinking water systems required to support Council by demonstrating aspects of due diligence under the Standard of Care requirements.

Findings from the 2014 reporting year continue to demonstrate the high performance of York Region's drinking water systems which are subject to strict regulations implemented by the Province of Ontario to keep drinking water clean and safe. This report also demonstrates the Region's commitment to operational excellence through continuous improvement, while also fulfilling our obligations to communicate performance to stakeholders and the public.

For more information on this report, please contact David Szeptycki, Head of Strategy, Liaison, and Policy Implementation at (905) 830-4444 at ext. 75723 or Brett Bloxam, Director of Operations, Maintenance, and Monitoring at ext. 75320.

Attachments (4)

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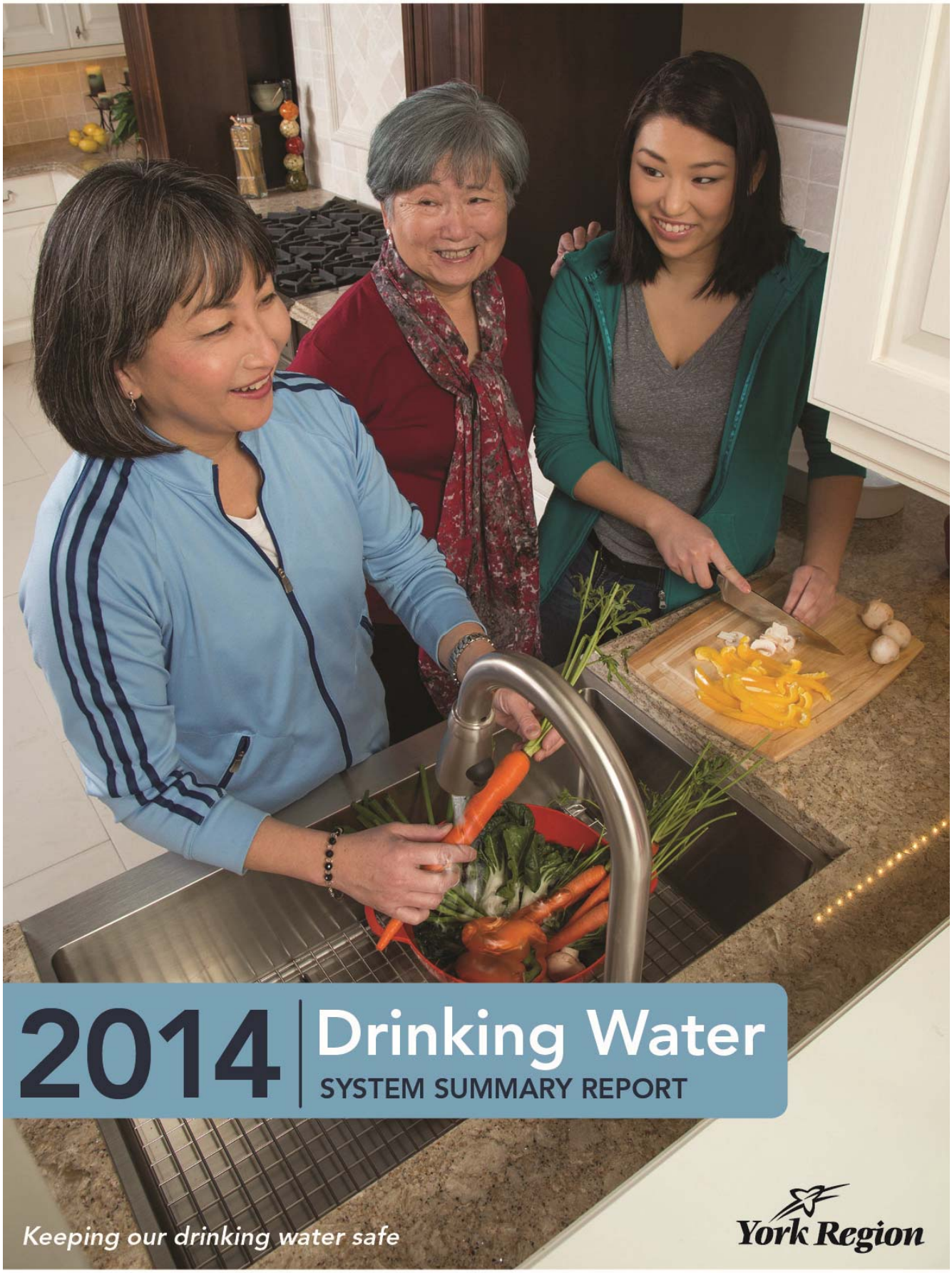
Accessible formats or communication supports are available upon request

Attachment 1



Accessible formats or communication supports are available upon request. Please contact us by email at environmentalservices@york.ca or by phone at 1-877-449-9675 ext. 73000.

A copy of this report is available at the Environmental Services Department counter located at the York Region Administrative Centre or online at www.york.ca

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Introduction

All municipal drinking water systems are mandated to report drinking water quality and quantity information under Schedule 22 and Section 11 of the Drinking Water Systems regulation (O. Reg. 170/03) under the *Safe Drinking Water Act, 2002*.

Schedule 22 requires York Region to submit a Drinking Water System Summary Report that summarizes information on annual compliance and capacity of drinking water systems. This information is provided to Council no later than March 31 of each year for the preceding calendar year. Section 11 requires York Region to prepare an Annual Water Quality Report to be made available to the public no later than February 28 of each year for the preceding calendar year. York Region staff posted the Section 11 reports online at www.york.ca/drinkingwater and provided copies to each of the nine local municipalities prior to the February 28 deadline. Information contained in these reports includes water quality sampling and testing results, in accordance with regulatory requirements allowing residents and businesses to review water quality testing data. This data is summarized in this report.

This Drinking Water System Summary Report explains how York Region uses a multi-barrier approach to keep drinking water safe. It also provides summaries for each individual water system which contains descriptions of system infrastructure, water quantity data and summaries of water quality test results.

York Region continues to provide clean, safe drinking water to residents and businesses. Proactively managing risk and supporting compliance is carried out every day by:

- Following a multi-barrier approach to ensure drinking water is kept clean, safe and reliable
- Complying with legislation and the Drinking Water Quality Management Standard to provide high quality drinking water
- Planning and constructing infrastructure to meet the needs of a growing Region
- Implementing innovative, progressive programs and securing strategic partnerships with industry and research leaders to drive innovation
- Operating and maintaining drinking water quality by completing thousands of tests to check that everything is operating properly, demonstrating the effectiveness of processes and ensuring that drinking water meets quality standards
- Maintaining robust training programs so that operators can continue to achieve excellence in delivering drinking water
- Maintaining an integrated management system to monitor compliance and drive continuous improvement, including ISO 9001 registration and performing audits to proactively manage risk

In 2014, all of York Region's Drinking Water Systems operated within the monthly average flow, maximum daily withdrawal and allowable daily withdrawal limits as set out in Permits to Take Water issued by the Ministry of the Environment and Climate Change.

York Region conducts a comprehensive sampling program that exceeds regulatory requirements. In 2014, 36,817 tests were performed on water quality samples, which resulted in 13 adverse results or 0.04 per cent of all samples collected. In addition to the sampling program, continuous monitoring of some parameters, including chlorine residual, is performed. There were also 10 adverses related to system performance events. Any adverse events are reported as required by the *Safe Drinking Water Act*. An adverse event does not necessarily indicate that drinking water is unsafe; it indicates that a parameter has fallen outside of a regulated operating range and corrective action must be taken. None of these incidents posed a health threat or resulted in service interruption to residents.

Keeping Our Drinking Water Safe

227
points to continuously monitor systems to ensure clean safe drinking water.

448
businesses interviewed for threats to source water.

90
applications reviewed to manage risks to source water.

36,817
water quality lab tests performed in 2014.

Provided
285 Million
litres per day of high quality water to residents and businesses.

24 Million
records generated to ensure optimal system performance each year.

Background

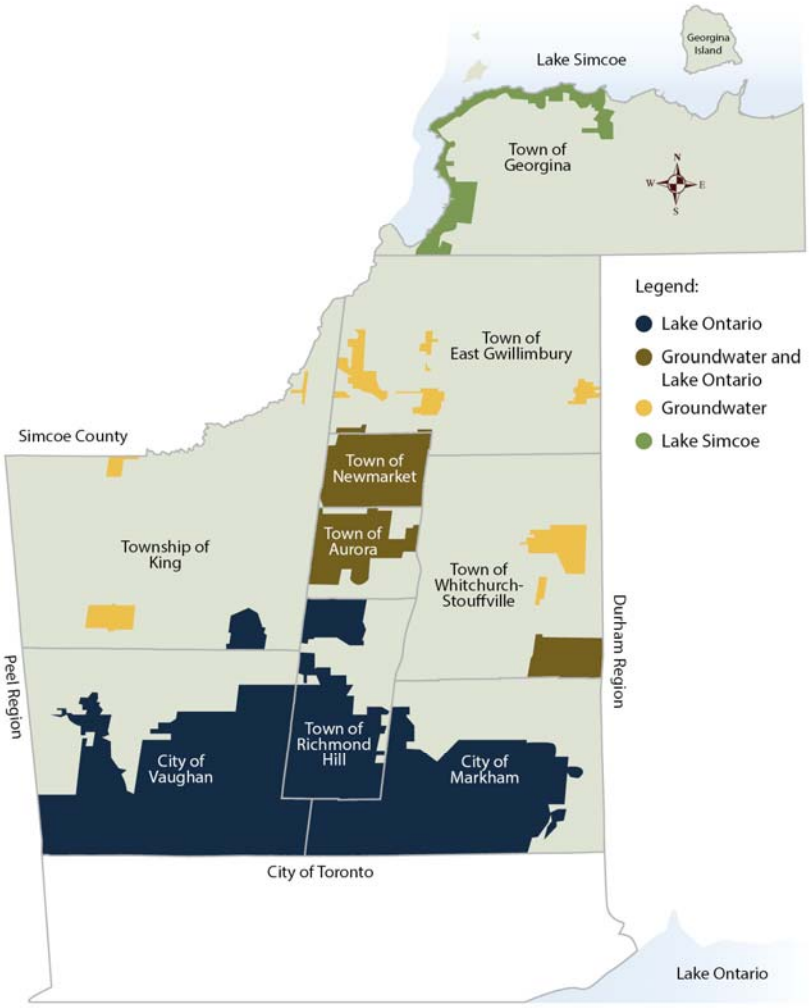
York Region is responsible for the supply, production, treatment, storage and transmission of drinking water to its nine municipalities: Town of Aurora, Town of East Gwillimbury, Town of Georgina, Township of King, City of Markham, Town of Newmarket, Town of Richmond Hill, City of Vaughan, and Town of Whitchurch-Stouffville. These local municipalities are responsible for distributing drinking water to residential, industrial, commercial and institutional customers within their communities.

York Region's drinking water sources are (Figure 1):

- Groundwater drawn from Regional aquifers
- Surface water drawn from Lake Ontario (provided through partnerships with the City of Toronto and the Regional Municipality of Peel (Peel Region))
- Surface water drawn from Lake Simcoe

To provide residents and businesses with safe and secure drinking water, York Region operates and maintains three water treatment plants, 22 pumping stations, 44 storage facilities (elevated tanks and reservoirs), 40 production wells and more than 344 kilometers of transmission mains to maintain an uninterrupted water supply. Co-ordinated use of groundwater and surface water drinking sources provides additional system security to areas supplied by the York Drinking Water System.

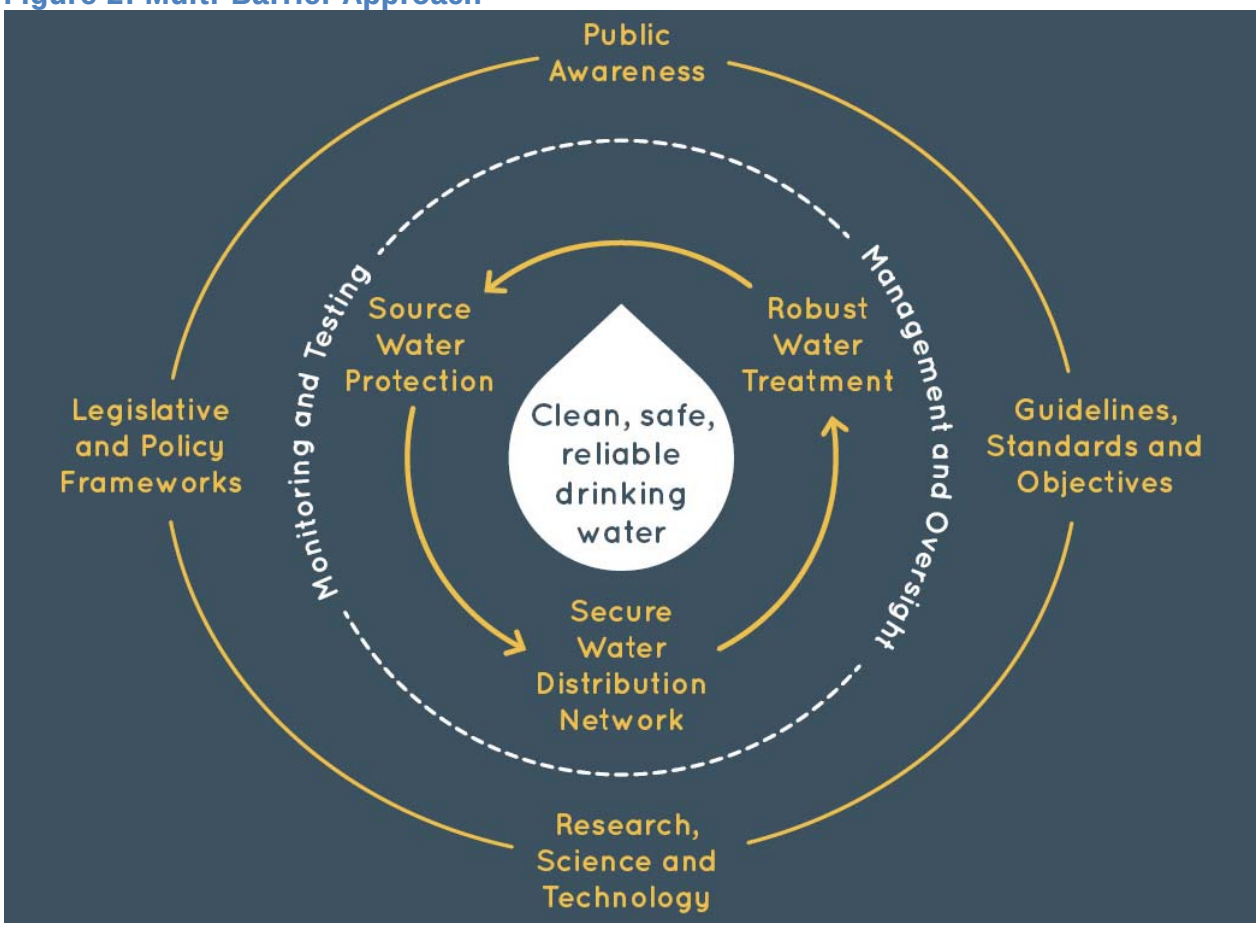
Figure 1 – Water Supply Sources in York Region



York Region uses a multi-barrier approach to protect drinking water

To protect drinking water and support the health and quality of life enjoyed by York Region residents, the Region uses a multi-barrier approach. This internationally recognized best practice uses an integrated system of procedures, processes and tools from source to tap to create a series of barriers, which operate collectively to prevent contamination and provide the high quality drinking water. Figure 2 outlines components of this multi-barrier approach and shows how York Region works to meet these challenges. This holistic approach incorporates many partners working together toward the goal of keeping drinking water safe, including Regional Councillors, water and wastewater operations staff, industry and academic researchers, vendors, suppliers, consultants, regulators and the public.

Figure 2: Multi-Barrier Approach



Source water protection

Starting at the source of all drinking water, source water protection is the first barrier that protects quality and quantity allowing continued delivery of high quality drinking water and ensuring sufficient water quantities exist. The cleaner the raw water we start with, the easier it is to deliver high quality drinking water. The two Source Protection Plans that apply in York Region will require action to manage existing risks to drinking water quality and quantity, and prevent future risks from being established. Although one plan was only recently approved by the Minister of the Environment and Climate Change, with the other still under review, York Region has been proactively implementing Source Water Protection for some time using existing tools such as the Regional Official Plan.

As a part of the Source Protection Program, York Region and its nine local municipal partners collaborate to ensure drinking water quality concerns are proactively addressed for development proposals within

vulnerable areas. Over 90 applications were reviewed in 2014, and conditions imposed to help protect drinking water. For activities that pose a potential risk to water quality that are already on the ground, Interim Risk Management Plans are being established to mitigate existing risks to drinking water supplies. Staff have engaged business owners and farmers from across the Region to verify potential threats on over 200 properties. From those efforts, four Interim Risk Management Plans are currently in effect in York Region and a dozen more are under development. Staffing and procedures are in place to ensure all required Risk Management Plans will be in effect and enforced within the next few years.

Water quantity is also addressed under source water protection. Potential stresses to water quantities have been thoroughly studied and Source Protection Plan policies require new development to maintain groundwater recharge rates. Policies to govern competing water demand will be implemented by the Province to help assure the long term viability of York Region's groundwater supplies.

In order to ensure source waters are protected, wastewater treatment must also be effective. In fact, the Sustainable Cities standard uses level of wastewater treatment as an indicator of quality of life. Sustainable Cities recognizes the direct correlation between improved quality of life and each level of increased wastewater treatment. York Region uses best-in-class treatment technology for wastewater resulting in high-quality treated water, which helps protect source water and the environment. York Region will continue to be a leader in wastewater treatment by being one of the first in Ontario to implement three-stage treatment technology at the Keswick Water Pollution Control Plant which includes a membrane filtration system and UV disinfection before returning water to the natural environment.

Robust water treatment

Robust water treatment systems are the second barrier to help ensure drinking water meets all regulatory requirements on a continuous basis. York Region has developed systems with multiple steps to treat drinking water, eliminate pathogens and safeguard against potential failures in the treatment process.

The Region's water treatment systems are complex and continuously monitored with advanced computer systems. There are approximately 180 critical control points under the Drinking Water Quality Management Standard (DWQMS) which are closely monitored with a series of alarms and controls to ensure high quality water is delivered to our customers. York Region's water operators are certified and highly trained on operation of treatment systems to be able to respond to potential issues that may occur and to meet regulatory requirements.

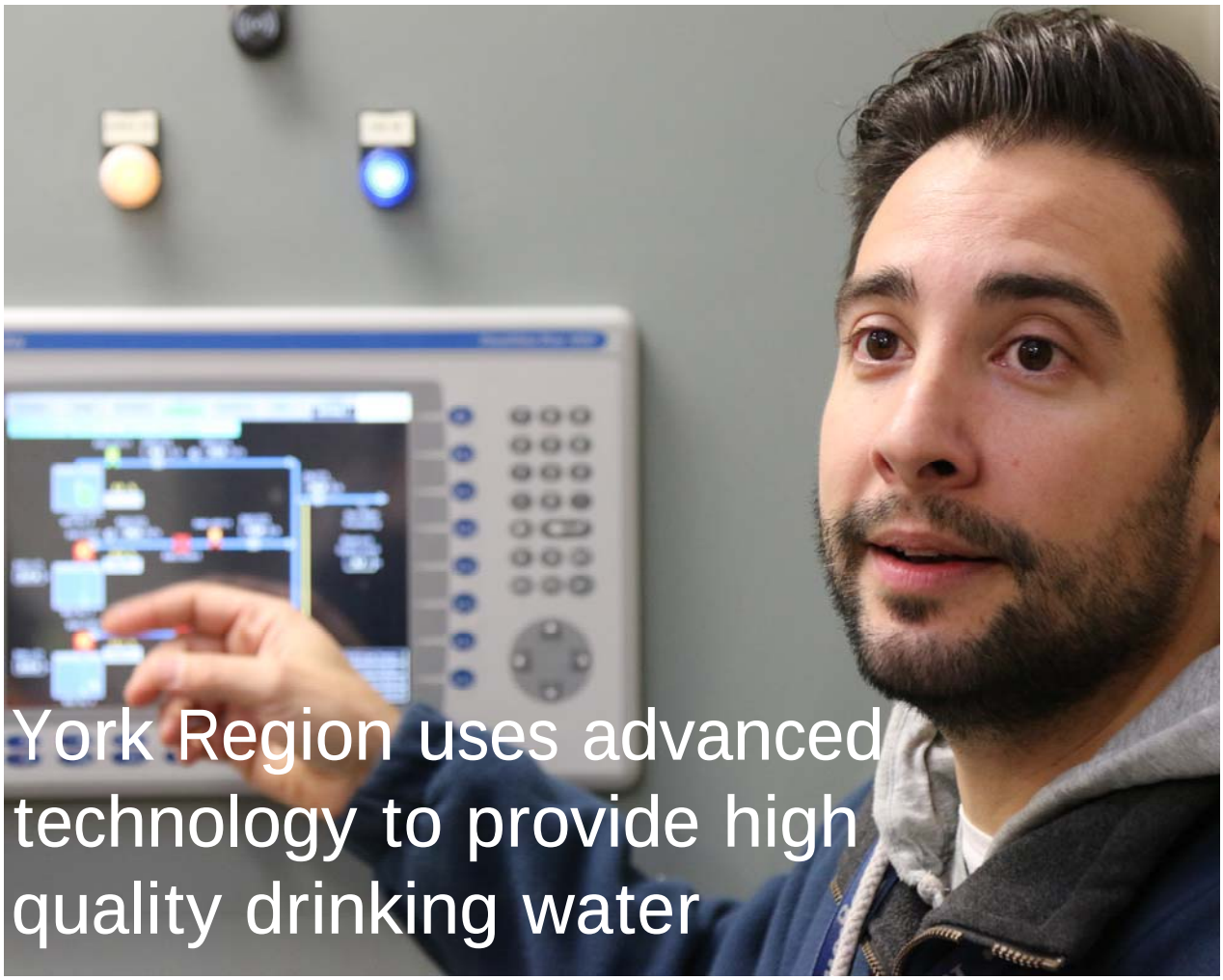
York Region continues to optimize treatment processes for wastewater and water by researching and developing improved methods at existing facilities. This is often performed in collaboration with external government partners such as the Ministry of the Environment and Climate Change (MOECC) and academic institutions, such as the University of Toronto.

A secure water supply network

Once water is treated, it needs to be distributed to customers in a way that ensures what comes out of the tap meets or exceeds quality standards. A secure water supply network is the third barrier in the York Region drinking water system.

To accomplish this, York Region has made significant investments in equipment that ensure water quality is maintained at proper levels throughout the system. York Region owns approximately 9 per cent of the length of the total water distribution system, while the local municipalities own the remaining 91 per cent of the system; collaboration is a key factor to ensure that drinking water quality is maintained. York Region and local municipal staff have been working together to establish best management practices for enhanced maintenance of the water distribution systems to further ensure quality standards are maintained.

Multi-barrier approach to protect drinking water (continued)



To meet requirements of the Drinking Water Quality Management Standard and protect this important part of the drinking water management system, York Region continues to focus on management of existing infrastructure, including treatment facilities and the distribution network. To implement and sustain the drinking water quality standard into ongoing operations, Environmental Services has established a dedicated Infrastructure Asset Management Branch. This team focuses on the following key objectives to help meet the drinking water quality management standard including:

- ✓ **Proactive Asset Renewal Program** –maintain infrastructure in sound and reliable condition to ensure quality service delivery to customers
- ✓ **Condition Assessment** - proactive assessment to determine asset conditions and understand potential risks. This assists in developing an effective long-term asset renewal program to ensure reliability of the water supply network
- ✓ **Sustainable Infrastructure**– ensure service continuity through implementing of adequate infrastructure in water supply network to avoid service interruptions in the event of emergencies as a part of proactive risk management

Multi-barrier approach to protect drinking water (continued)

Monitoring programs

Ensuring that water quality is maintained from source to tap by monitoring water quality is the fourth barrier in the system. York Region performs continuous monitoring of its systems and samples water regularly. The Region maintains a comprehensive sampling program with 36,817 water samples analyzed in 2014.

York Region exceeds regulatory requirements for both the number of parameters analyzed and the frequency of sampling. In addition to laboratory testing, a Supervisory Control And Data Acquisition (SCADA) system remotely monitors and controls treatment systems to provide continuous feedback on water quality parameters, such as chlorine. There are 227 analyzers to continuously monitor and record chlorine residual rates which generate more than 24 million records per year to inform operations and demonstrate due diligence. This system has the ability to automatically 'lock out' proactively to avoid water quality issues. Locking out the system shuts off the water supply from a treatment plant or well system until the issue is investigated and addressed by a certified water operator and acceptable water quality parameters are re-established. In the event of a lock out, water continues to be supplied to customers through the Region's extensive storage system.

York Region is committed to continuously improving its drinking water systems by maintaining ISO 9001 certification and operating a Drinking Water Quality Management Standard. The Region uses its Integrated Management System to ensure compliance with these standards and drive continuous improvement in the system. In addition, the Region collaborates with academic and industry partners to research and develop new methods and technologies to assess and monitor treatment and distribution system performance.

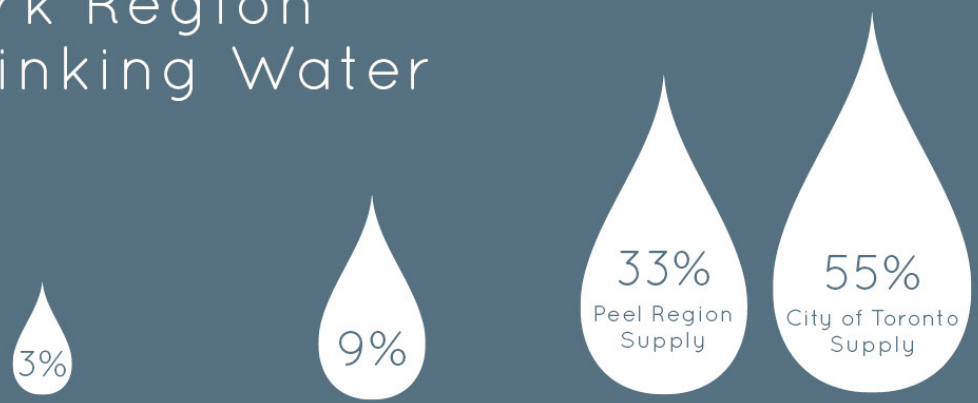
Prepared to respond to adverse conditions

York Region works diligently to provide high quality drinking water and provides staff the robust training required to respond in the event of a potential issue, which is the fifth barrier in the system. Staff are provided defined procedures to assist them in responding to an incident such as reporting an adverse water quality incident to the Ministry of the Environment and Climate Change and York Region Public Health or responding to a water transmission main break. The Integrated Management System maintains procedures that outline steps to address the issue and ensures the appropriate agencies are notified. Certified Operators and laboratory staff notify the following stakeholders immediately after an adverse water quality sample result is obtained:

- ✓ Ministry of the Environment and Climate Change Spills Action Centre
- ✓ York Region Medical Officer of Health
- ✓ Local municipalities
- ✓ City of Toronto
- ✓ Region of Peel

Following this multi-barrier approach has helped York Region maintain a high standard of drinking water quality. The Region is committed to continuing to provide high quality drinking water to customers and is consistently ranked amongst the best in drinking water management in the Greater Toronto Area based on Ministry of the Environment and Climate Change inspections.

Sources of York Region Drinking Water



Lake Simcoe | Groundwater | Lake Ontario (88%)

Number of tests performed and adverse events reported on submitted water samples taken in 2014

total number of tests performed 36,817

16,732 organic 45%

10,170 micro 28%

9,915 inorganic 27%

13 adverse 0.04%

total adverse sample results = 0.04 per cent

Summary of Water Supply Provided to Communities in York Region

York Region is the wholesale supplier of water to the nine local municipalities and is responsible for the supply, production, treatment, storage, and transmission of water. The local municipalities own and operate the distribution system delivering the water from Regional water transmission mains to homes, businesses and schools in the local communities. York Region operates a dynamic and integrated water system to effectively meet the needs of customers. The table below is a summary of the drinking water systems and the communities they serve. Based on operational strategies, individual sources are used at varying rates throughout the year to optimize use of water resources.

Table 1 – Drinking Water Systems and Communities Served

Drinking Water System	Community Served	Local Municipality
Groundwater Sources		
Ansnorveldt Drinking Water System	Ansnorveldt	King
Ballantrae/Musselman's Lake Drinking Water System	Ballantrae/Musselman's Lake	Whitchurch-Stouffville
Mount Albert Drinking Water System	Mount Albert	East Gwillimbury
Nobleton Drinking Water System	Nobleton	King
Schomberg Drinking Water System	Schomberg	King
Groundwater and Lake water (Blended Sources)		
York Drinking Water System	Aurora	Aurora
	Holland Landing	East Gwillimbury
	Newmarket	Newmarket
	Queensville	East Gwillimbury
	Sharon	East Gwillimbury
	Stouffville	Whitchurch-Stouffville
Lake Ontario (Surface Water Sources)		
York Drinking Water System	Markham	Markham
	Richmond Hill	Richmond Hill
	King City	King
	Vaughan	Vaughan
	Kleinburg	Vaughan
Lake Simcoe (Surface Water Sources)		
Georgina Drinking Water System	Keswick	Georgina
	Sutton	Georgina
	Lakeside Communities	Georgina

Ansnorveldt

drinking water system

[groundwater]

Ansnorveldt is a rural community located on Dufferin Street, north of Highway #9 in the Township of King. The community is largely based on the agricultural industry and is centrally located in the Holland Marsh.

To improve the overall water supply in the Ansnorveldt Drinking Water System, Well No. 1 was decommissioned and replaced with Well No. 3 in 2013.

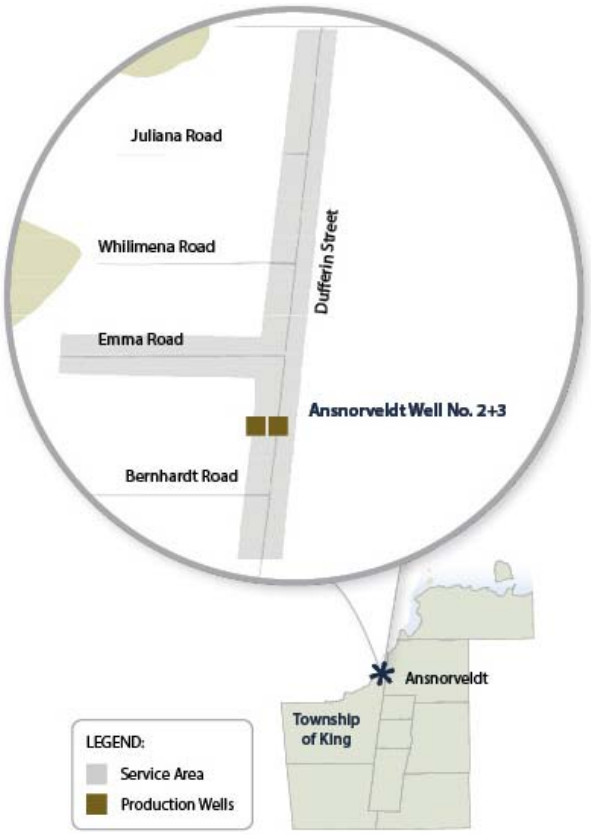
Raw Water Source Description

Water is supplied by two wells and services fewer than 100 homes, a school, church and a library. Water withdrawal is regulated by a Permit to Take Water issued by the MOECC.

Wells are screened in the deep aquifer. Groundwater quality meets the Ontario Drinking Water Quality Standard. Aesthetic parameters like iron and operational parameters like hardness fall outside the normal operating range, which is common in deep aquifers in York Region. Staff use these raw water test results to better inform water treatment.

Water Treatment

Water treatment for the Ansnorveldt wells is comprised of the addition of sodium hypochlorite for disinfection. Water from the wells is combined, treated and pumped into a concrete reservoir. High lift pumps deliver the water to the distribution system. Treatment processes throughout the facility are monitored by online analyzers equipped with alarms and lockouts to alert operational staff of conditions requiring attention.



Summary of Approvals and Permits

Municipal Drinking Water License Number:	103-108
Issue Number:	Issue 4
Issue Date:	January 27, 2015
Expiry Date:	January 26, 2020
Renewal Date:	July 27, 2019
Drinking Water Works Permit Number:	013-208
Issue Number:	Issue 3
Issue Date:	January 27, 2015
Permit To Take Water Number:	8037-94XPXR
Issue Date:	March 15, 2013
Expiry Date:	March 31, 2021
Operational Plan Number:	013-408
Financial Plan Number:	013-301A
MOECC Waterworks Number:	260002213
System Classification:	Water Distribution and Supply II

Ansnorveldt Drinking Water System Performance Summary:

[hpc] Heterotrophic Plate Count (microbial test for general level of bacteria)

RAW	208 samples	0 e-coli results	0 total coliforms	n/a hpc samples	n/a hpc results
TREATED	104 samples	0 e-coli results	0 total coliforms	52 hpc samples	0 to 1500 hpc results

Average Treated Water Concentration (mg/L)	41 sodium	122 hardness	0.20 fluoride

- Turbidity (Treated)
  8760 samples
  ranged 0.05 to 5.00 ntu
  [min. to max.]
- Turbidity (Raw)
  58 samples
  ranged 0.09 to 2.26 ntu
  [min. to max.]
- Chlorine (Free)
  8760 samples
  ranged 0.00 to 5.01 mg/L
  [min. to max.]

Permitted and Actual Maximum Daily Withdrawal from the Ansnorveldt Production Wells for January 1 to December 31, 2014

Location	*Permitted Daily Withdrawal (litres)*	*Actual Maximum Daily Withdrawal (litres)*	*Number of Days Operating at Peak Capacity (May to October)*	*Number of Days Operating at Peak Capacity (Annual)*
Well 2	184,320	115,380 January 7, 2014	0	1
Well 3	115,200	53,870 June 26, 2014	0	0

Permitted and Actual Maximum Annual Withdrawal from the Ansnorveldt Production Wells for January 1 – December, 2014

109,324,800 litres	23,996,740 litres	22 per cent
Annual Permitted Withdrawal	Actual Annual Withdrawal	Percentage of Permitted Annual Withdrawal

System Monthly Average Flow

January	February	March	April	May	June
58,213	35,921	63,314	85,710	95,925	110,217
July	**August**	**September**	**October**	**November**	**December**
103,170	88,440	40,952	34,338	33,592	36,497

Ballantrae/Musselman's Lake

[groundwater]

drinking water system

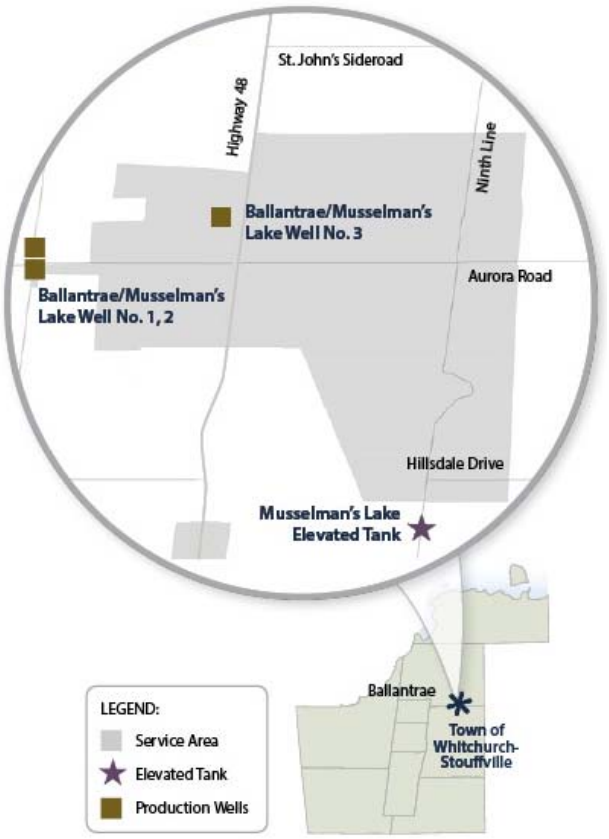
York Region operates three wells and one elevated tank servicing the community of Ballantrae/Musselman's Lake in the Town of Whitchurch-Stouffville. Water withdrawal from each of the wells is regulated by a Permit to Take Water issued by the MOECC.

Raw Water Source Description
Wells are screened in the deep aquifer. Groundwater quality meets the Ontario Drinking Water Quality Standard. Aesthetic parameters like iron and operational parameters like hardness fall outside the normal operating range, which is common in deep aquifers in York Region. Staff use these raw water test results to better inform water treatment.

Water Treatment
Water from the Ballantrae/Musselman's Lake wells is treated by adding sodium hypochlorite and chlorine gas for disinfection and sodium silicate to sequester iron to reduce potential staining of plumbing fixtures and laundry.

Treatment processes throughout the facility are monitored by online analyzers equipped with alarms and lockouts to alert operational staff of conditions requiring attention.

Water pumped from the wells receives treatment before it enters the distribution system. There is currently one storage tank servicing the community of Ballantrae/Musselman's Lake.



Summary of Approvals and Permits

Municipal Drinking Water License Number:	013-106
Issue Number:	Issue 5
Issue Date:	January 27, 2015
Expiry Date:	January 26, 2020
Renewal Date:	July 27, 2019
Drinking Water Works Permit Number:	013-206
Issue Number:	Issue 3
Issue Date:	January 27, 2015
Permit To Take Water Number:	2030-8KDJCG
Issue Date:	August 3, 2012
Expiry Date:	March 31, 2016
Operational Plan Number:	013-406
Financial Plan Number:	013-301A
MOECC Waterworks Number:	220008658
System Classification:	Water Distribution and Supply II

Ballantrae/Musselman's Lake Drinking Water System Performance Summary:

[hpc] Heterotrophic Plate Count(microbial test for general level of bacteria)

RAW	312 samples	0 e-coli results	0 total coliforms	n/a hpc samples	n/a hpc results
TREATED	208 samples	0 e-coli results	0 total coliforms	104 hpc samples	<1 to 42 hpc results

Average Treated Water Concentration (mg/L)	12	191	0.07
	sodium	hardness	fluoride

- Turbidity (Treated)
  8760 samples
  ranged 0.02 to 3.97 ntu
  [min. to max.]
- Turbidity (Raw)
  79 samples
  ranged 0.04 to 15.3 ntu
  [min. to max.]
- Chlorine (Free)
  8760 samples
  ranged 0.53 to 3.00 mg/L
  [min. to max.]

Permitted and Actual Maximum Daily Withdrawal from the Ballantrae/Musselman's Lake Production Wells for January 1 to December 31, 2014

Location	*Permitted Daily Withdrawal (litres)*	*Actual Maximum Daily Withdrawal (litres)*	*Number of Days Operating at Peak Capacity (May to October)*	*Number of Days Operating at Peak Capacity (Annual)*
Well 1	2,617,920	1,304,000 July 15, 2014	0	0
Well 2	2,617,920	1,506,000 May 13, 2014	0	0
Well 3	2,617,920	1,489,920 February 2, 2014	0	0
Well 1, 2 + 3	4,580,000	2,591,100 July 6, 2014	0	0

Permitted and Actual Maximum Annual Withdrawal from the Ballantrae/Musselman's Lake Production Wells for January 1 – December, 2014

1,671,700,000 litres	403,437,810 litres	25 per cent
Annual Permitted Withdrawal	Actual Annual Withdrawal	Percentage of Permitted Annual Withdrawal

System Monthly Average Flow

January	February	March	April	May	June
890,361	852,564	88,678	904,977	1,223,416	1,548,993
July	**August**	**September**	**October**	**November**	**December**
1,631,081	1,498,129	1,224,807	918,871	828,283	901,858

Mount Albert

drinking water system

[groundwater]

York Region operates three production wells servicing the community of Mount Albert in the Town of East Gwillimbury. Water withdrawal from each of the wells is regulated by a Permit to Take Water, issued by the MOECC.

Raw Water Source Description

Wells are screened in the deep aquifer. Groundwater quality meets the Ontario Drinking Water Quality Standard. Aesthetic parameters like iron and manganese fall outside the normal operating range, which is common in deep aquifers in York Region. Staff use these raw water test results to better inform water treatment.

Water Treatment

Water is treated for the Mount Albert wells prior to entry into the distribution system by adding sodium hypochlorite and chlorine gas for disinfection. Sodium silicate is added following chlorination to sequester iron to reduce potential staining of plumbing fixtures and laundry.

Treatment processes throughout the facility are monitored by online analyzers equipped with alarms and lockouts to alert operational staff of conditions requiring attention.

There is currently one storage tank servicing the community of Mount Albert.

Summary of Approvals and Permits

Municipal Drinking Water License Number:	013-103
Issue Number:	Issue 3
Issue Date:	January 27, 2015
Expiry Date:	January 26, 2020
Renewal Date:	July 27, 2019
Drinking Water Works Permit Number:	013-203
Issue Number:	Issue 3
Issue Date:	January 27, 2015
Permit To Take Water Number:	0050-7FCMMY
Issue Date:	June 9, 2008
Expiry Date:	March 31, 2018
Operational Plan Number:	013-403
Financial Plan Number:	013-301A
MOECC Waterworks Number:	220006543
System Classification:	Water Distribution and Supply II

Mount Albert Drinking Water System
Performance Summary:

[hpc] Heterotrophic Plate Count (microbial test for general level of bacteria)

RAW	312 samples	0 e-coli results	0 total coliforms	n/a hpc samples	n/a hpc results
TREATED	208 samples	0 e-coli results	0 total coliforms	104 hpc samples	<1 to 20 hpc results

Average Treated Water Concentration (mg/L)	12 sodium	310 hardness	0.05 fluoride

- Turbidity (Treated)
  8760 samples
  ranged 0.0 to 4.47 ntu
  [min. to max.]
- Turbidity (Raw)
  69 samples
  ranged 0.03 to 15.0 ntu
  [min. to max.]
- Chlorine (Free)
  8760 samples
  ranged 0.00 to 4.09 mg/L
  [min. to max.]

Permitted and Actual Maximum Daily Withdrawal from the Mount Albert Production Wells for January 1 to December 31, 2014

Location	*Permitted Daily Withdrawal (litres)*	*Actual Maximum Daily Withdrawal (litres)*	*Number of Days Operating at Peak Capacity (May to October)*	*Number of Days Operating at Peak Capacity (Annual)*
Well 1	3,273,120	1,706,600 May 17, 2014	0	0
Well 2	3,273,120	1,604,000 May 11, 2014	0	0
Well 3	3,273,120	1,802,625 February 2, 2014	0	0
Well 1, 2 + 3	4,990,000	2,157,662 October 11, 2014	0	0

Permitted and Actual Maximum Annual Withdrawal from the Mount Albert Production Wells for January 1 – December, 2014

1,821,350,000 litres	351,942,598 litres	19 per cent
Annual Permitted Withdrawal	Actual Annual Withdrawal	Percentage of Permitted Annual Withdrawal

System Monthly Average Flow

January	February	March	April	May	June
1,032,245	970,365	962,562	902,082	997,049	1,092,605
July	**August**	**September**	**October**	**November**	**December**
1,066,087	981,493	904,332	865,396	885,275	910,010

Nobleton

drinking water system

[groundwater]

York Region currently operates two wells servicing the community of Nobleton in the Township of King. Water withdrawal from each of the wells is regulated by a Permit to Take Water, issued by the MOECC.

The addition of the new well (Well No. 5) will provide adequate standby capacity to service growth anticipated in the community when it comes online in 2015.

Raw Water Source Description
Wells are screened in the deep aquifer. Groundwater quality meets the Ontario Drinking Water Quality Standard. Aesthetic parameters like iron and operational parameters like hardness fall outside the normal operating range, which is common in deep aquifers in York Region. Staff use these raw water test results to better inform water treatment.

Water Treatment
Water pumped from Wells No. 2 and 3 receives treatment before it enters the distribution system. Water treatment for Well No. 2 includes the addition of chlorine gas for disinfection, while Well 3 uses sodium hypochlorite.

Sodium silicate is added to the treatment process to sequester iron to reduce potential staining of plumbing fixtures and laundry.

Treatment processes throughout the facilities are monitored by online analyzers equipped with alarms and lockouts to alert operational staff of conditions requiring attention.

Following treatment, water enters the distribution system and is stored in two elevated tanks.

Summary of Approvals and Permits

Municipal Drinking Water License Number:	013-105
Issue Number:	Issue 3
Issue Date:	January 27, 2015
Expiry Date:	January 26, 2020
Renewal Date:	July 27, 2019
Drinking Water Works Permit Number:	013-205
Issue Number:	Issue 4
Issue Date:	January 27, 2015
Permit To Take Water Number:	0550-9PPRJ9
Issue Date:	October 14, 2014
Expiry Date:	December 31, 2019
Operational Plan Number:	013-405
Financial Plan Number:	013-301A
MOECC Waterworks Number:	220002306
System Classification:	Water Distribution and Supply II

Nobleton Drinking Water System
Performance Summary:

[hpc] Heterotrophic Plate Count (microbial test for general level of bacteria)

RAW	200 samples	0 e-coli results	0 to 1 total coliforms	n/a hpc samples	n/a hpc results
TREATED	196 samples	0 e-coli results	0 total coliforms	98 hpc samples	0 to 2 hpc results

Average Treated Water Concentration (mg/L)	17	271	0.1
	sodium	hardness	fluoride

- Turbidity (Treated)
  8760 samples
  ranged 0.03 to 5.00 ntu
  [min. to max.]
- Turbidity (Raw)
  64 samples
  ranged 0.06 to 2.05 ntu
  [min. to max.]
- Chlorine (Free)
  8760 samples
  ranged 0.22 to 3.01 mg/L
  [min. to max.]

Permitted and Actual Maximum Daily Withdrawal from the Nobleton Production Wells for January 1 to December 31, 2014

Location	*Permitted Daily Withdrawal (litres)*	*Action Maximum Daily Withdrawal (litres)*	*Number of Days Operating at Peak Capacity (May to October)*	*Number of Days Operating at Peak Capacity (Annual)*
Well 2	1,964,000	1,684,060 February 2, 2014	1*	12*
Well 3	2,496,000	1,606,000 December 1, 2014	0	0
Well 5	2,496,000	Not in service	-	-
Well 2, 3 + 5	4,460,000	-	-	-

* Wells are considered to be operating at peak capacity if withdrawal is within 80 per cent of permitted capacity.

Permitted and Actual Maximum Annual Withdrawal from the Nobleton Production Wells for January 1 – December, 2014

1,627,900,000 litres	464,470,678 litres	28 per cent
Annual Permitted Withdrawal	Actual Annual Withdrawal	Percentage of Permitted Annual Withdrawal

System Monthly Average Flow

January	February	March	April	May	June
1,029,801	1,005,927	1,026,104	1,094,296	1,289,060	1,559,415
July	**August**	**September**	**October**	**November**	**December**
1,659,458	1,701,452	1,330,233	1,182,171	1,112,654	1,254,109

Schomberg

drinking water system

[groundwater]

York Region operates a groundwater treatment plant supplied by three wells servicing the community of Schomberg in the Township of King. Water withdrawal from each of the wells is regulated by a Permit to Take Water issued by the MOECC.

Raw Water Source Description

Wells are screened in the deep aquifer. Groundwater quality meets the Ontario Drinking Water Quality Standard. Aesthetic parameters like iron and manganese along with operational parameters like hardness fall outside the normal operating range. Staff use these raw water test results to better inform water treatment.

Water Treatment

The Schomberg Water Treatment Plant was commissioned in December 2009. Three production wells pump into the treatment plant where water is stripped of naturally occurring methane and treated with potassium permanganate to remove iron and manganese. Water is disinfected using ultraviolet light and chlorine. Naturally occurring ammonia is used in the treatment process to provide chloramination as a secondary disinfectant for the distribution system.

Treatment processes throughout the facility are monitored by online analyzers equipped with alarms and lockouts to alert operational staff of conditions requiring attention.

Following treatment, water enters the distribution system and is stored in one elevated tank currently servicing the community of Schomberg.

Summary of Approvals and Permits

Municipal Drinking Water License Number:	013-110
Issue Number:	Issue 4
Issue Date:	January 27, 2015
Expiry Date:	January 26, 2020
Renewal Date:	July 27, 2019
Drinking Water Works Permit Number:	013-210
Issue Number:	Issue 3
Issue Date:	January 27, 2015
Permit To Take Water Number:	0706-7E8T5G
Issue Date:	June 3, 2008
Expiry Date:	April 30, 2018
Operational Plan Number:	013-410
Financial Plan Number:	013-301A
MOECC Waterworks Number:	220004901
System Classification:	Water Treatment II

Schomberg Drinking Water System Performance Summary:

[hpc] Heterotrophic Plate Count (microbial test for general level of bacteria)

RAW	312 samples	0 e-coli results	0 total coliforms	n/a hpc samples	n/a hpc results
TREATED	104 samples	0 e-coli results	0 total coliforms	52 hpc samples	0 to 1 hpc results

Average Treated Water Concentration (mg/L)	19 sodium	282 hardness	0.12 fluoride

- Turbidity (Treated)
  8760 samples
  ranged 0.08 to 5.00 ntu
  [min. to max.]
- Turbidity (Raw)
  86 samples
  ranged 0.06 to 15.2 ntu
  [min. to max.]
- Chlorine (Free)
  8760 samples
  ranged 0.73 to 2.90 mg/L
  [min. to max.]

Permitted and Actual Maximum Daily Withdrawal from the Schomberg Production Wells for January 1 to December 31, 2014

Location	*Permitted Daily Withdrawal (litres)*	*Actual Maximum Daily Withdrawal (litres)*	*Number of Days Operating at Peak Capacity (May to October)*	*Number of Days Operating at Peak Capacity (Annual)*
Well 2	1,636,560	673,300 May 20, 2014	0	0
Well 3	2,290,000	1,520,600 December 18, 2014	0	0
Well 4	1,507,680	995,100 May 27, 2014	0	0

Permitted and Actual Maximum Annual Withdrawal from the Schomberg Production Wells for January 1 – December, 2014

1,983,497,600 litres	329,338,300 litres	17 per cent
Annual Permitted Withdrawal	Actual Annual Withdrawal	Percentage of Permitted Annual Withdrawal

System Monthly Average Flow

January	February	March	April	May	June
822,968	761,968	805,835	722,623	831,452	827,587
July	**August**	**September**	**October**	**November**	**December**
825,587	861,255	1,086,493	1,136,145	1,095,840	1,040,206

York

drinking water system

[surface water – Lake Ontario]

The York Drinking Water System consists of pumping stations, storage facilities and large diameter water transmission mains required to transmit water between pumping stations and storage facilities.

York Region services the southern end of the Region (King City, Kleinburg, City of Markham, Town of Richmond Hill, and the City of Vaughan) exclusively with surface water from Lake Ontario supplied by the City of Toronto and Peel Region. Figure 3 provides a visual representation of the areas where Lake Ontario water is provided, blue areas are exclusively lake water, brown areas receive a blend of lake water and groundwater.

Water Treatment
Lake-Based Supply: Water supplied to the local municipalities from the York Drinking Water System is sourced from Lake Ontario. Raw water is treated by the City of Toronto or Peel Region and enters through York Region's transmission system. There is no further treatment performed by York Region as the water travels to the local municipal distribution systems.

Toronto Water Supplied to York Region
For the agreement between the City of Toronto and York Region (Toronto/York Water Supply Agreement) York Region budgeted a maximum of 502,260,000 litres per day for 2014.

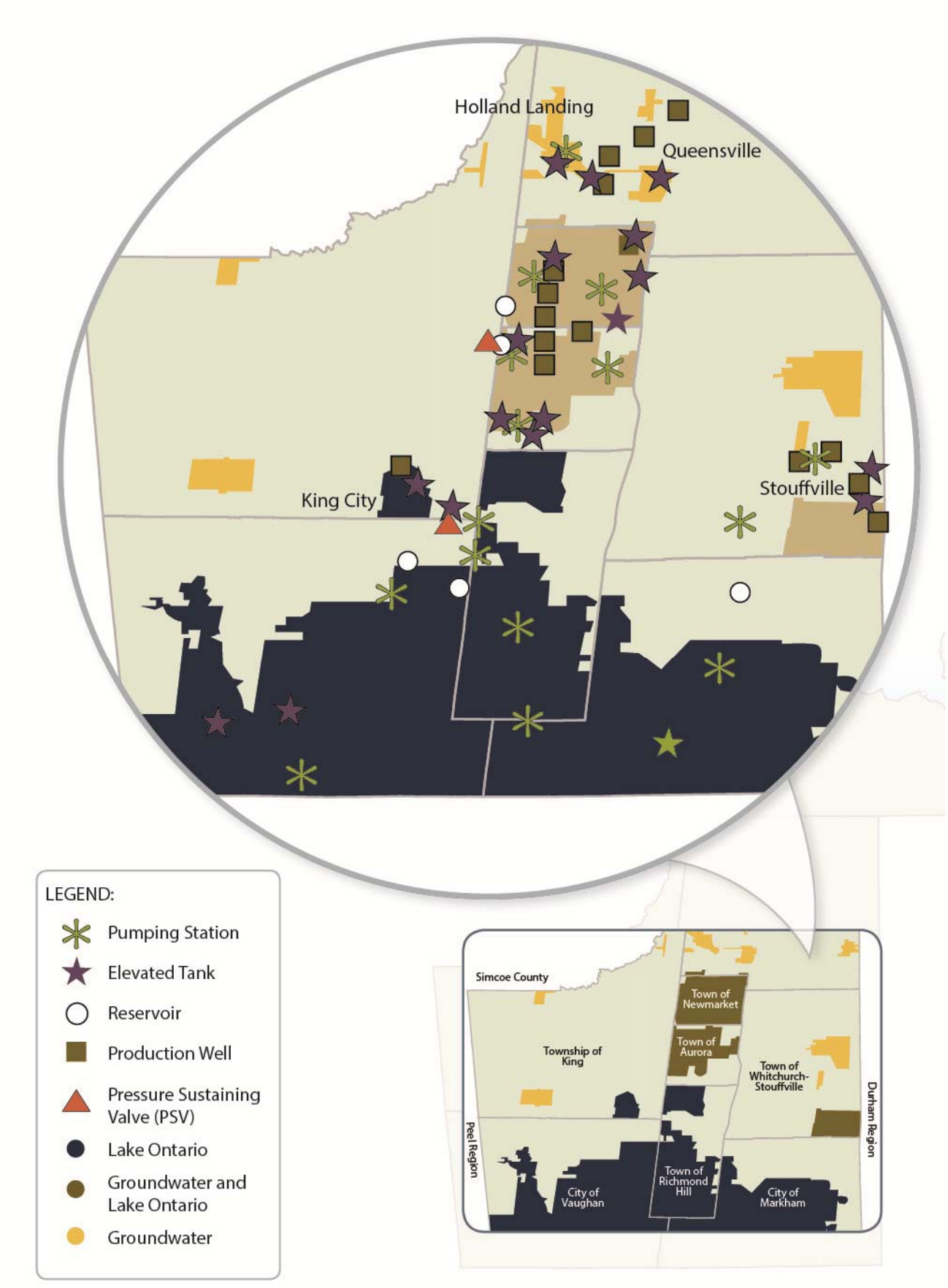
The average volume of water supplied from Toronto to the York Drinking Water System for the reporting period was 177,795,417 litres per day. The system operated at 35 per cent of the budgeted volume and remained within the maximum limit established in the operating agreement.

Peel Water Supplied to York Region
For the agreement between the Region of Peel and York Region (York/Peel Water Supply Agreement) York Region budgeted a maximum of 179,861,000 litres per day for 2014.

The average volume of water supplied from Peel Region to the York Drinking Water System for the reporting period was 107,409,083 litres per day. The system operated at 60 per cent of the budgeted volume and remained within the maximum limit established in the operating agreement.

Accommodating Future Growth
York Region currently transfers volumes that are below the maximum quantities permitted under these agreements. Maximum permitted volumes have been set to allow for annual increases required to service forecasted population growth to 2031.

Figure 3: York Drinking Water System service area



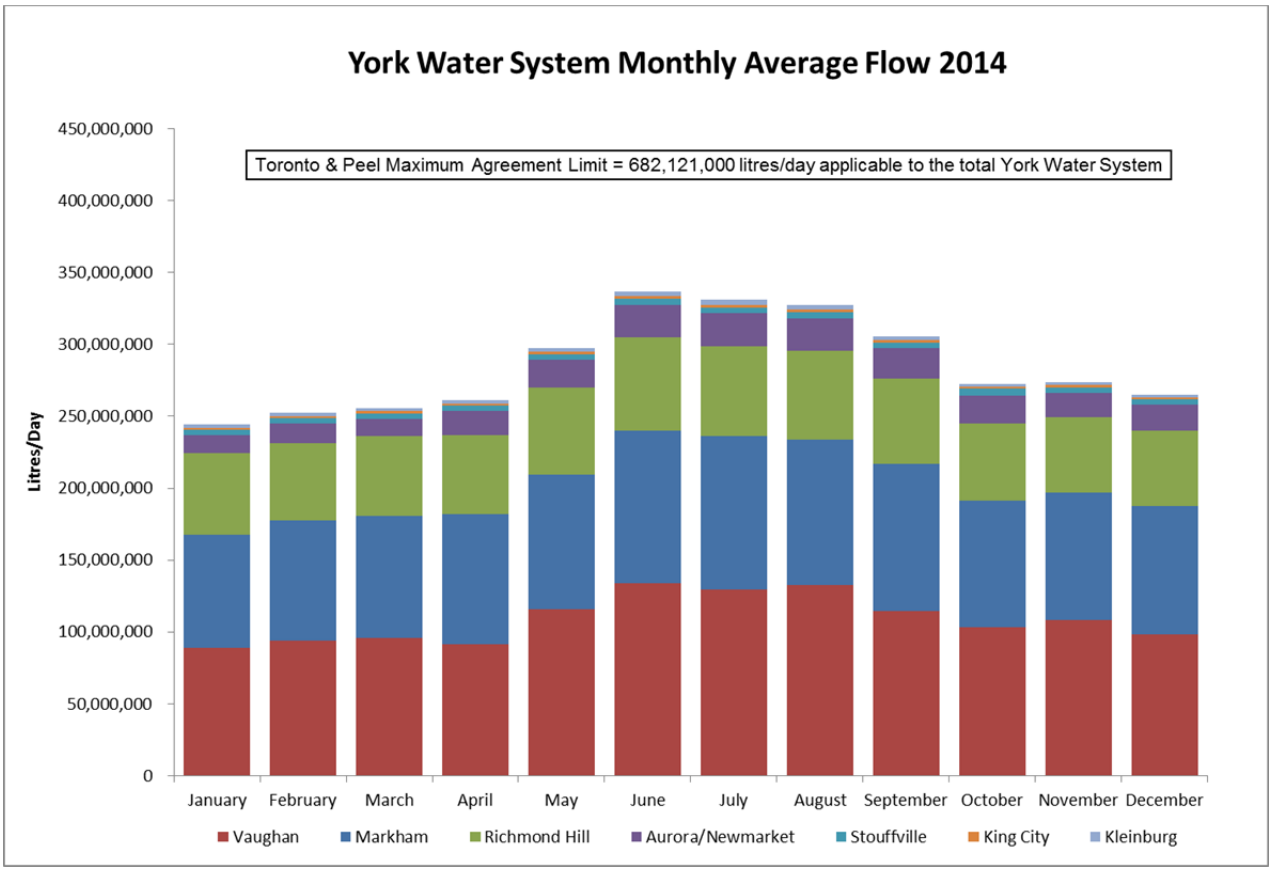
York Drinking Water System Performance Summary:

[hpc] Heterotrophic Plate Count (microbial test for general level of bacteria)

TREATED	1974 samples	0 e-coli results	0 to 1 total coliforms	466 hpc samples	0 to 180 hpc results

Average Treated Water Concentration (mg/L)	17 sodium	128 hardness	0.51 fluoride

- Turbidity (Treated) N/A
- Turbidity (Raw) N/A
- Chlorine (Free) 1783 samples ranged 0.28 to 2.44 mg/L [min. to max.]



York Region performed 36,817 water quality tests in 2014

York

drinking water system

[surface + groundwater]

The York Drinking Water System consists of wells, pumping stations, storage facilities and large diameter water transmission mains required to transmit water between pumping stations and storage facilities. The York Drinking Water System supplies water to the Towns of Aurora, East Gwillimbury, Newmarket and Whitchurch-Stouffville.

Surface water is blended with groundwater within the York Drinking Water System. Township of King and Community of Kleinburg have been converted to lake water only, but continue to maintain wells for backup supply. The description of each groundwater source within the York Drinking Water System is provided in the following sections of the report.

Water Treatment

Lake-Based Supply: The majority of the water supplied to the local municipalities from the York Drinking Water System is sourced from Lake Ontario. Raw water is treated by the City of Toronto or Peel Region and enters through York Region's transmission system. No further treatment is performed by York Region as the water travels to the local municipal distribution systems, however some of the water storage facilities in Aurora and Newmarket have the ability to chloraminate water if required. Fluoride is not added to the York Drinking Water System groundwater supply, however the City of Toronto and Peel Region add fluoride to lake-based water supplies.

Groundwater Supply: Groundwater in the York Drinking Water System is treated and blended with the lake-based water supplied by City of Toronto and Peel Region. To ensure the treatment processes for groundwater are consistent with the lake-based water, the groundwater wells in the York Drinking Water System are treated with a combination of

Water Treatment (continued)

chlorine and ammonia to form chloramine, a secondary disinfectant.

Sodium silicate is added to the treatment process to reduce potential staining of plumbing fixtures and laundry. Treatment processes throughout facilities are monitored by online analyzers which are equipped with alarms and lockouts to alert operational staff of conditions requiring attention. Treatment is consistent for all groundwater supply systems in the York Drinking Water System unless otherwise indicated in the following sections.

Summary of Approvals and Permits

The amount of lake based water withdrawn for the York Drinking Water System is limited to the amounts set within the long term water supply agreements York Region has with Peel Region and the City of Toronto which are further discussed on page 20. Water withdrawal from each of the groundwater wells in the York Drinking Water System is regulated by a Permit to Take Water issued by the MOECC for the Yonge Street Aquifer as a whole.


York Region’s five stage multi-barrier approach results in high quality drinking water

Aurora

[surface + groundwater]

drinking water sub-system
York Drinking Water System

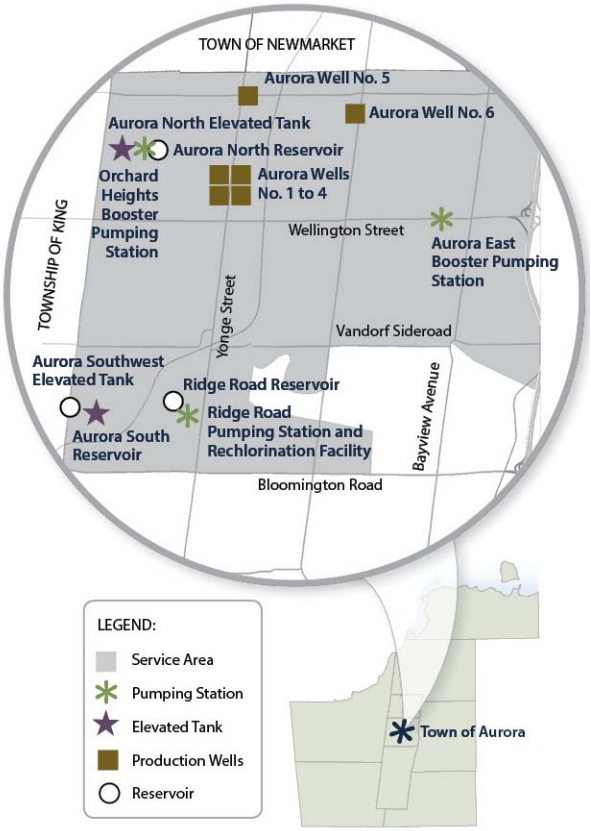
York Region operates six wells in the Town of Aurora that draw water from the Yonge Street Aquifer. Water withdrawal from each of the wells is regulated by a Permit to Take Water issued by the MOECC. The Aurora wells are part of an interconnecting system between Aurora, East Gwillimbury, Newmarket and the York Drinking Water System.

York Region supplements groundwater supply in Aurora with lake based water. The intent is to manage demand on the aquifer and provide additional security by having a second supply source.

Raw Water Source Description
Wells are mostly screened in the deep aquifer. Groundwater quality meets the Ontario Drinking Water Quality Standard. Aesthetic parameters like iron and operational parameters like hardness fall outside the normal operating range, which is common in deep aquifers in York Region. Staff use these raw water test results to better inform water treatment.

Water Treatment
Well water is treated with a combination of chlorine and ammonia to form chloramine. Sodium silicate is also added to reduce potential staining of plumbing fixtures and laundry. Processes throughout the well system are monitored by online analyzers equipped with alarms and lockouts to alert operational staff of conditions requiring attention.

Currently, there are two reservoirs and two elevated tanks servicing Town of Aurora.



Summary of Approvals and Permits

Municipal Drinking Water License Number:	013-101
Issue Number:	Issue 5
Issue Date:	January 27, 2015
Expiry Date:	January 26, 2020
Renewal Date:	July 27, 2019
Drinking Water Works Permit Number:	013-201
Issue Number:	Issue 7
Issue Date:	January 27, 2015
Permit To Take Water Number:	6728-9NQ2F
Issue Date:	September 12,2014
Expiry Date:	December 31, 2023
Operational Plan Number:	013-401
Financial Plan Number:	013-301A
MOECC Waterworks Number:	220002440
System Classification:	Water Distribution and Supply III

Aurora Drinking Water System Performance Summary:

[hpc] Heterotrophic Plate Count (microbial test for general level of bacteria)

RAW	568 samples	0 e-coli results	0 to 6 total coliforms	2 hpc samples	49 to 560 hpc results
TREATED	248 samples	0 e-coli results	0 total coliforms	124 hpc samples	0 to 43 hpc results

Average Treated Water Concentration (mg/L)	16 sodium	183 hardness	0.11 fluoride

- Turbidity (Treated)
  8760 samples
  ranged 0.02 to 5.01 ntu
  [min. to max.]
- Turbidity (Raw)
  145 samples
  ranged 0.12 to 1.23 ntu
  [min. to max.]
- Chlorine (Combined)
  8760 samples
  ranged 0.45 to 2.97 mg/L
  [min. to max.]

Permitted and Actual Maximum Daily Withdrawal from the Aurora Production Wells for January 1 to December 31, 2014

Location	*Permitted Daily Withdrawal (litres)*	*Actual Maximum Daily Withdrawal (litres)*	*Number of Days Operating at Peak Capacity (May to October)*	*Number of Days Operating at Peak Capacity (Annual)*
Well 1	3,273,120	2,898,000 November 21, 2014	7*	12*
Well 2	5,891,760	4,775,000 November 21, 2014	0	0
Well 3	5,237,136	4,339,000 June 16, 2014	0	0
Well 4	7,855,632	5,990,250 June 16, 2014	0	0
Well 5	5,891,760	4,669,750 February 27, 2014	0	0
Well 6	3,469,536	2,391,000 April 9, 2014	0	0

* Wells are considered to be operating at peak capacity if withdrawal is within 80 per cent of permitted capacity.

Permitted and Actual Maximum Annual Withdrawal from the Aurora Production Wells for January 1 – December, 2014

11,540,914,560 litres	3,509,045,930 litres	30 per cent
Annual Permitted Withdrawal	Actual Annual Withdrawal	Percentage of Permitted Annual Withdrawal

System Monthly Average Flow

January	February	March	April	May	June
11,389,108	11,408,914	12,837,290	8,914,867	10,962,484	9,999,933
July	**August**	**September**	**October**	**November**	**December**
8,779,129	8,411,484	7,850,667	8,082,806	9,381533	7,446,935

Holland Landing

[surface + groundwater]

drinking water sub-system
York Drinking Water System

York Region operates two wells servicing the community of Holland Landing in the Town of East Gwillimbury. Holland Landing wells draw water from the Yonge Street Aquifer. These wells are part of an interconnecting system between Aurora, East Gwillimbury, Newmarket and the York Drinking Water System. Water withdrawal from each of the wells is regulated by a Permit to Take Water issued by the MOECC.

Raw Water Source Description
Wells are mostly screened in the deep aquifer. Groundwater quality meets the Ontario Drinking Water Quality Standard. Aesthetic parameters like iron and operational parameters like hardness fall outside the normal operating range, which is common in deep aquifers in York Region. Staff use these raw water test results to better inform water treatment.

Water Treatment
Well water is treated with a combination of chlorine and ammonia to form chloramine. Sodium silicate is also added to reduce potential staining of plumbing fixtures and laundry. Treatment processes throughout the system are monitored by online analyzers equipped with alarms and lockouts to alert operational staff of conditions requiring attention.

Currently, there are two elevated tanks servicing the community of Holland Landing.

Summary of Approvals and Permits

Municipal Drinking Water License Number:	013-101
Issue Number:	Issue 5
Issue Date:	January 27, 2015
Expiry Date:	January 26, 2020
Renewal Date:	July 27, 2019
Drinking Water Works Permit Number:	013-201
Issue Number:	Issue 7
Issue Date:	January 27, 2015
Permit To Take Water Number:	6728-9NLQ2F
Issue Date:	September 12, 2014
Expiry Date:	December 31, 2023
Operational Plan Number:	013-401
Financial Plan Number:	013-301A
MOECC Waterworks Number:	220004046
System Classification:	Water Distribution and Supply III

Holland Landing Drinking Water System
Performance Summary:

[hpc] Heterotrophic Plate Count (microbial test for general level of bacteria)

RAW	208 samples	0 e-coli results	0 total coliforms	n/a hpc samples	n/a hpc results
TREATED	208 samples	0 e-coli results	0 total coliforms	104 hpc samples	0 to 83 hpc results

Average Treated Water Concentration (mg/L)	22	172	0.18
	sodium	hardness	fluoride

- Turbidity (Treated)
  8760 samples
  ranged 0.02 to 4.82 ntu
  [min. to max.]
- Turbidity (Raw)
  68 samples
  ranged 0.10 to 0.85 ntu
  [min. to max.]
- Chlorine (Combined)
  8760 samples
  ranged 0.54 to 2.89 mg/L
  [min. to max.]

Permitted and Actual Maximum Daily Withdrawal from the Holland Landing Production Wells for January 1 to December 31, 2014

Location	*Permitted Daily Withdrawal (litres)*	*Actual Maximum Daily Withdrawal (litres)*	*Number of Days Operating at Peak Capacity (May to October)*	*Number of Days Operating at Peak Capacity (Annual)*
Well 1	2,291,184	1,755,000 July 17, 2014	0	0
Well 2	3,600,432	2,787,000 July 17, 2014	0	0

Permitted and Actual Maximum Annual Withdrawal from the Holland Landing Production Wells for January 1 – December, 2014

1,316,448,860 litres	382,859,990 litres	29 per cent
Annual Permitted Withdrawal	Actual Annual Withdrawal	Percentage of Permitted Annual Withdrawal

System Monthly Average Flow

January	February	March	April	May	June
797,134	795,189	767,115	870,567	1,043,806	1,106,700
July	**August**	**September**	**October**	**November**	**December**
1,417,968	1,124,903	1,175,800	1,021,871	1,132,700	1,311,774

King City

drinking water sub-system
York Drinking Water System

[surface + groundwater/backup supply]

In 2014, the King City community was 100 per cent supplied by Lake Ontario water. York Region operates two wells in King City in the Township of King as backup supply only.

The groundwater system has been updated to a chloramination system to allow the groundwater wells to blend with the current lake based source and provide a backup supply to be used in the event emergency capacity is required. Groundwater withdrawal from each of the wells is regulated by a Permit to Take Water issued by the MOECC.

Raw Water Source Description
Wells are screened in the deep aquifer. Groundwater quality meets the Ontario Drinking Water Quality Standard. Aesthetic parameters like iron and operational parameters like hardness fall outside the normal operating range, which is common in deep aquifers in York Region. Staff use these raw water test results to better inform water treatment.

Water Treatment
If King City wells are used for emergency capacity, water will be treated with a combination of chlorine and ammonia to form chloramine. Sodium silicate is added to reduce potential staining of plumbing fixtures and laundry. Treatment processes throughout the system monitored by online analyzers equipped with alarms and lockouts to alert operational staff of conditions requiring attention.

Currently, there are two elevated tanks servicing the community of King City.

Summary of Approvals and Permits

Municipal Drinking Water License Number:	013-101
Issue Number:	Issue 5
Issue Date:	January 27, 2015
Expiry Date:	January 26, 2020
Renewal Date:	July 27, 2019
Drinking Water Works Permit Number:	013-201
Issue Number:	Issue 7
Issue Date:	January 27, 2015
Permit To Take Water Number:	1407-9MRQYL
Issue Date:	September 5, 2014
Expiry Date:	December 31, 2024
Operational Plan Number:	013-407
Financial Plan Number:	013-301A
MOECC Waterworks Number:	220002299
System Classification:	Water Distribution and Supply II

King City Drinking Water System Performance Summary:

[hpc] Heterotrophic Plate Count (microbial test for general level of bacteria)

RAW	200 samples	0 e-coli results	0 total coliforms	n/a hpc samples	n/a hpc results
TREATED	n/a samples	n/a e-coli results	n/a total coliforms	n/a hpc samples	n/a hpc results

Average Treated Water Concentration (mg/L)*	n/a sodium	n/a hardness	n/a fluoride

* Samples were taken only for raw water. King City wells are on standby only to be used to provide emergency capacity, as a result no samples were required for treated water.

- Turbidity (Treated)
  0 samples*
- Turbidity (Raw)
  52 samples
  ranged 0.09 to 2.65 ntu
  [min. to max.]
- Chlorine (Combined)
  0 samples*

Permitted and Actual Maximum Daily Withdrawal from the King City Production Wells for January 1 to December 31, 2014

Location	*Permitted Daily Withdrawal (litres)*	*Actual Maximum Daily Withdrawal (litres)*	*Number of Days Operating at Peak Capacity (May to October)*	*Number of Days Operating at Peak Capacity (Annual)*
Well 3*	1,963,915	45,400 August 20, 2014	0	0
Well 4*	2,618,554	133,100 December 17, 2014	0	0

* King City Well 3 and 4 maximum daily withdrawals are a result of running the wells to collect weekly raw water regulatory samples. Both wells are on standby and the King City drinking water system is supplied with the City of Toronto and Peel Region lake-based water supply.

Permitted and Actual Maximum Annual Withdrawal from the King City Production Wells for January 1 – December, 2014

1,672,601,185 litres	3,136,810 litres	0 per cent
Annual Permitted Withdrawal	Actual Annual Withdrawal	Percentage of Permitted Annual Withdrawal

System Monthly Average Flow

January	February	March	April	May	June
5,925	8,186	7,262	9,077	4,284	8,983
July	**August**	**September**	**October**	**November**	**December**
10,523	10,948	7,090	12,342	7,253	11,152

Kleinburg

[surface + groundwater/backup supply]

drinking water sub-system
York Drinking Water System

In 2014, Kleinburg community was 100 per cent supplied by Lake Ontario water. York Region operates two wells in the community of Kleinburg in the City of Vaughan as a backup supply only. Well No. 2 was decommissioned in February 2014. Water withdrawl from each of the wells is regulated by a Permit to Take Water issued by the MOECC

The groundwater system was updated to a chloramination system to allow the groundwater wells to blend with the current lake based source and provide a backup supply to be used in the event emergency capacity is required.

Raw Water Source Description
Wells are screened in the deep aquifers. Groundwater quality meets the Ontario Drinking Water Quality Standard. Aesthetic parameters like iron and operational parameters like hardness fall outside the normal operating range, which is common in deep aquifers in York Region. Staff use these raw water test results to better inform water treatment.

Water Treatment
If Kleinburg wells are used for emergency capacity. Water treatment includes the addition of chlorine gas for disinfection. Sodium silicate is added to the treatment process to sequester iron and reduce potential staining of plumbing fixtures and laundry. Treatment processes throughout the system are monitored by online analyzers equipped with alarms and lockouts to alert operational staff of conditions requiring attention.

Water enters the distribution system and is stored in the one elevated tank currently servicing the community of Kleinburg.

Summary of Approvals and Permits

Municipal Drinking Water License Number:	013-101
Issue Number:	Issue 5
Issue Date:	January 27, 2015
Expiry Date:	January 26, 2020
Renewal Date:	July 27, 2019
Drinking Water Works Permit Number:	013-201
Issue Number:	Issue 7
Issue Date:	January 27, 2015
Permit To Take Water Number:	1407-9MRQYL
Issue Date:	September 5, 2014
Expiry Date:	December 31, 2024
Operational Plan Number:	013-407
Financial Plan Number:	013-301A
MOECC Waterworks Number:	220002360
System Classification:	Water Distribution and Supply II

Kleinburg Drinking Water System Performance Summary:

[hpc] Heterotrophic Plate Count (microbial test for general level of bacteria)

RAW	208 samples	0 e-coli results	0 total coliforms	n/a hpc samples	n/a hpc results
TREATED	n/a samples	n/a e-coli results	n/a total coliforms	n/a hpc samples	n/a hpc results

Average Treated Water Concentration (mg/L)*	n/a sodium	n/a hardness	n/a fluoride

* Samples were taken only for raw water. Kleinburg wells are on standby only to be used to provide emergency capacity, as a result no samples were required for treated water.

- Turbidity (Treated)
  0 samples*
- Turbidity (Raw)
  57 samples
  ranged 0.1 to 1.32 ntu
  [min. to max.]
- Chlorine (Free)
  0 samples*

Permitted and Actual Maximum Daily Withdrawal from the Kleinburg Production Wells for January 1 to December 31, 2014

Location	*Permitted Daily Withdrawal (litres)*	*Actual Maximum Daily Withdrawal (litres)*	*Number of Days Operating at Peak Capacity (May to October)*	*Number of Days Operating at Peak Capacity (Annual)*
Well 2 (Decommissioned February ,2014)	950,400	-	-	-
Well 3 + 4*	5,237,000	220,000 November 12, 2014	0	0

* Kleinburg Well 3 and 4 maximum daily withdrawals are a result of running the wells to collect weekly raw water regulatory samples. Both wells are on standby and the Kleinburg drinking water system is supplied with the City of Toronto and Peel Region lake-based water supply.

Permitted and Actual Maximum Annual Withdrawal from the Kleinburg Production Wells for January 1 – December, 2014

2,258,401,000 litres	4,323,615 litres	0 per cent
Annual Permitted Withdrawal	Actual Annual Withdrawal	Percentage of Permitted Annual Withdrawal

System Monthly Average Flow

January	February	March	April	May	June
9,791	9,471	10,590	13,230	9,697	7,590
July	**August**	**September**	**October**	**November**	**December**
12,384	9,297	7,650	17,258	30,393	4,935

Newmarket

[surface + groundwater]

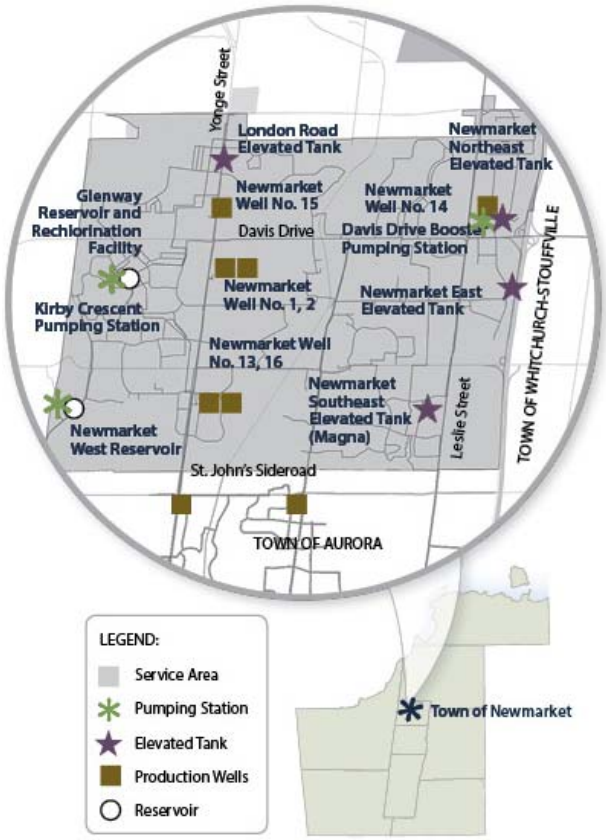
drinking water sub-system
York Drinking Water System

York Region currently operates six wells in the Town of Newmarket that draw water from the Yonge Street Aquifer. Water withdrawal from each of the wells is regulated by a Permit to Take Water issued by the MOECC. Newmarket wells are part of an interconnecting system between Aurora, East Gwillimbury, Newmarket, and the York Drinking Water System.

Raw Water Source Description
Wells are screened in deep aquifers. Groundwater quality meets the Ontario Drinking Water Quality Standard. Aesthetic parameters like iron and operational parameters like hardness fall outside the normal operating range, which is common in deep aquifers in York Region. Staff use these raw water test results to better inform water treatment.

Water Treatment
Well water is treated with a combination of chlorine and ammonia to form chloramine. Sodium silicate is also added to reduce potential staining of plumbing fixtures and laundry. Treatment processes throughout the system are monitored by online analyzers which are equipped with alarms and lockouts to alert operational staff of conditions requiring attention.

Currently, there are two reservoirs and four elevated tanks servicing the community of Newmarket.



Summary of Approvals and Permits

Municipal Drinking Water License Number:	013-101
Issue Number:	Issue 5
Issue Date:	January 27, 2015
Expiry Date:	January 26, 2020
Renewal Date:	July 27, 2019
Drinking Water Works Permit Number:	013-201
Issue Number:	Issue 7
Issue Date:	January 27, 2015
Permit To Take Water Number:	6728-9NLQ2F
Issue Date:	September 12, 2014
Expiry Date:	December 31, 2023
Operational Plan Number:	013-401
Financial Plan Number:	013-301A
MOECC Waterworks Number:	220002413
System Classification:	Water Distribution and Supply III

Newmarket Drinking Water System Performance Summary:

[hpc] Heterotrophic Plate Count (microbial test for general level of bacteria)

RAW	498 samples	0 to <1 e-coli results	0 to 3 total coliforms	7 hpc samples	9 to >3,000 hpc results
TREATED	278 samples	0 e-coli results	0 total coliforms	139 hpc samples	0 to 290 hpc results

Average Treated Water Concentration (mg/L)	16 sodium	194 hardness	0.13 fluoride

- Turbidity (Treated)
  8760 samples
  ranged 0.00 to 5.01 ntu
  [min. to max.]
- Turbidity (Raw)
  98 samples
  ranged 0.13 to 0.84 ntu
  [min. to max.]
- Chlorine (Combined)
  8760 samples
  ranged 0.22 to 3.20 mg/L
  [min. to max.]

Permitted and Actual Maximum Daily Withdrawal from the Newmarket Production Wells for January 1 to December 31, 2014

Location	*Permitted Daily Withdrawal (litres)*	*Actual Maximum Daily Withdrawal (litres)*	*Number of Days Operating at Peak Capacity (May to October)*	*Number of Days Operating at Peak Capacity (Annual)*
Well 1	2,291,184	1,209,800 June 10, 2014	0	0
Well 2	4,582.512	2,675,000 July 24, 2014	0	0
Well 13	5,891,760	3,267,000 July 24, 2014	0	0
Well 14*	2,291,184	96,340 July 17, 2014	0	0
Well 15	3,273,120	2,396,000 August 23, 2014	0	0
Well 16	5,629,824	3,442,000 July 24, 2014	0	0

* Newmarket Well 14 maximum daily withdrawal is a result of running the well to collect weekly raw water regulatory samples.

Permitted and Actual Maximum Annual Withdrawal from the Newmarket Production Wells for January 1 – December, 2014

8,745,248,160 litres	2,058,233,195 litres	23 per cent
Annual Permitted Withdrawal	Actual Annual Withdrawal	Percentage of Permitted Annual Withdrawal

System Monthly Average Flow

January	February	March	April	May	June
5,027,539	5,371,791	5,269,081	5,136,290	4,524,097	5,013,010
July	**August**	**September**	**October**	**November**	**December**
7,955,672	7,552,952	6,550,355	5,620,717	5,285,613	4,317,797

Queensville

[surface + groundwater]

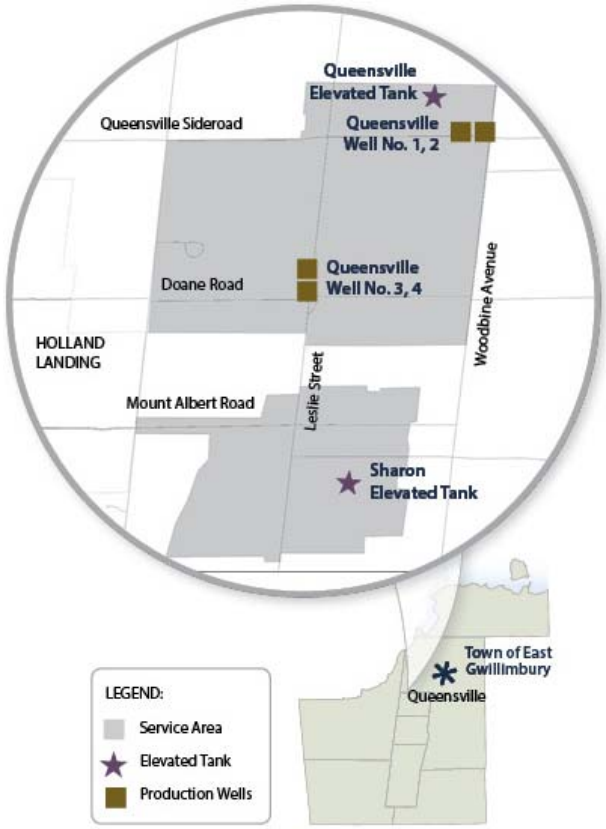
drinking water sub-system
York Drinking Water System

York Region operates four wells in the community of Queensville in the Town of East Gwillimbury. Water withdrawal from each of the wells is regulated by a Permit to Take Water issued by the MOECC. These wells supply water to the residents of Sharon, Queensville, Holland Landing and Newmarket. Queensville wells draw water from the Yonge Street Aquifer complex and are part of an interconnecting drinking water system between Aurora, East Gwillimbury, Newmarket and the York Drinking Water System.

Raw Water Source Description
Wells are screened in deep aquifers. Groundwater quality meets the Ontario Drinking Water Quality Standard. Aesthetic parameters like iron and operational parameters like hardness fall outside the normal operating range, which is common in deep aquifers in York Region. Staff use these raw water test results to better inform water treatment.

Water Treatment
Well water is treated with a combination of chlorine and ammonia to form chloramine. Sodium silicate is also added to reduce potential staining of plumbing fixtures and laundry. Treatment processes throughout the facility are monitored by online analyzers which are equipped with alarms and lockouts to alert operational staff of conditions requiring attention.

Currently, there are two elevated tanks servicing the communities of Queensville and Sharon.



Summary of Approvals and Permits

Municipal Drinking Water License Number:	013-101
Issue Number:	Issue 5
Issue Date:	January 27, 2015
Expiry Date:	January 26, 2020
Renewal Date:	July 27, 2019
Drinking Water Works Permit Number:	013-201
Issue Number:	Issue 7
Issue Date:	January 27, 2015
Permit To Take Water Number:	6728-9NLQ2F
Issue Date:	September 12, 2014
Expiry Date:	December 31, 2023
Operational Plan Number:	013-401
Financial Plan Number:	013-301A
MOECC Waterworks Number:	260001955
System Classification:	Water Distribution and Supply III

Queensville Drinking Water System Performance Summary:

[hpc] Heterotrophic Plate Count (microbial test for general level of bacteria)

RAW	416 samples	0 e-coli results	0 to 1 total coliforms	n/a hpc samples	n/a hpc results
TREATED	208 samples	0 e-coli results	0 total coliforms	104 hpc samples	0 to 340 hpc results

Average Treated Water Concentration (mg/L)	21	167	0.18
	sodium	hardness	fluoride

- Turbidity (Treated)
  8760 samples
  ranged 0.00 to 2.48 ntu
  [min. to max.]
- Turbidity (Raw)
  78 samples
  ranged 0.13 to 1.51 ntu
  [min. to max.]
- Chlorine (Combined)
  8760 samples
  ranged 0.31 to 3.29 mg/L
  [min. to max.]

Permitted and Actual Maximum Daily Withdrawal from the Queensville Production Wells for January 1 to December 31, 2014

Location	*Permitted Daily Withdrawal (litres)*	*Actual Maximum Daily Withdrawal (litres)*	*Number of Days Operating at Peak Capacity (May to October)*	*Number of Days Operating at Peak Capacity (Annual)*
Well 1	6,546,384	4,868,000 May 30, 2014	0	0
Well 2	6,546,384	5,568,000 June 10, 2014	0	0
Well 3	6,546,384	5,051,000 May 30, 2014	0	0
Well 4	6,546,384	4,620,000 November 27, 2014	0	0

Permitted and Actual Maximum Annual Withdrawal from the Queensville Production Wells for January 1 – December, 2014

9,557,720,640 litres	2,310,657,250 litres	24 per cent
Annual Permitted Withdrawal	Actual Annual Withdrawal	Percentage of Permitted Annual Withdrawal

System Monthly Average Flow

January	February	March	April	May	June
7,591,452	6,181,723	5,924,290	5,145,233	6,380,194	6,309,633
July	**August**	**September**	**October**	**November**	**December**
7,285,258	6,709,871	6,319,533	5,605,194	6,466,600	5,998,548

Stouffville

[surface + groundwater]

drinking water sub-system
York Drinking Water System

York Region operates five wells servicing the community of Stouffville. Water withdrawal from each of the wells is regulated by a Permit to Take Water issued by the MOECC. Groundwater supply is supplemented with lake based water.

Raw Water Source Description

Wells are screened in two separate aquifers: shallow and deep aquifers. Groundwater quality meets the Ontario Drinking Water Quality Standard. Groundwater in the shallow aquifer wells (Wells No. 3, 5 and 6) show higher chloride, sulphate and sodium concentrations in comparison to Wells No. 1 and 2, which are in the deep aquifer. Shallow groundwater in York Region typically has higher concentrations due to impacts from the surrounding land use activities. To reduce these impacts, Transportation Services and Environmental Services are collaborating on an update to the road salt management plan for vulnerable groundwater areas. Concentrations remain within safe limits and trends are monitored on an ongoing basis. Aesthetic parameters like iron and operational parameters like hardness fall outside the normal operating range, which is common in deep aquifers in York Region. Staff use these raw water test results to better inform water treatment.

Water Treatment

Stouffville Wells No. 5 and 6 are Groundwater Under Direct Influence (GUDI). Water treatment for Stouffville wells includes the addition of chlorine for disinfection. At Wells No. 5 and 6, an ultraviolet light system achieves primary disinfection of the raw water prior to addition of chlorine to maintain residual levels. At Zone 2 pumping station, treated lake based water from Toronto gets converted from chloramine to free chlorine. Treatment processes throughout the system are continuously monitored and are equipped with alarms and automatic lockouts.

Currently, there are two reservoirs and two elevated tanks servicing Stouffville.

Summary of Approvals and Permits

Municipal Drinking Water License Number:	013-101
Issue Number:	Issue 5
Issue Date:	January 27, 2015
Expiry Date:	January 26, 2020
Renewal Date:	July 27, 2019
Drinking Water Works Permit Number:	013-201
Issue Number:	Issue 7
Issue Date:	January 27, 2015
Permit To Take Water Number:	7104-986FSJ
Issue Date:	July 12, 2013
Expiry Date:	March 31, 2017
Operational Plan Number:	013-401
Financial Plan Number:	013-301A
MOECC Waterworks Number:	220002333
System Classification:	Water Distribution and Supply III, Water Treatment I

Stouffville Drinking Water System Performance Summary:

[hpc] Heterotrophic Plate Count (microbial test for general level of bacteria)

RAW	500 samples	0 e-coli results	0 total coliforms	n/a hpc samples	n/a hpc results
TREATED	300 samples	0 e-coli results	0 total coliforms	150 hpc samples	<1 to 110 hpc results

Average Treated Water Concentration (mg/L)	35 sodium	292 hardness	0.08 fluoride

- Turbidity (Treated)
  8760 samples
  ranged 0.00 to 5.00 ntu
  [min. to max.]
- Turbidity (Raw)
  141 samples
  ranged 0.03 to 1.01 ntu
  [min. to max.]
- Chlorine (Free)
  8760 samples
  ranged 0.00 to 3.00 mg/L
  [min. to max.]

Permitted and Actual Maximum Daily Withdrawal from the Stouffville Production Wells for January 1 to December 31, 2014

Location	*Permitted Daily Withdrawal (litres)*	*Actual Maximum Daily Withdrawal (litres)*	*Number of Days Operating at Peak Capacity (May to October)*	*Number of Days Operating at Peak Capacity (Annual)*
Well 1	2,946,250	1,477,000 March 13, 2014	0	0
Well 2	2,946,250	1,869,000 September 7, 2014	0	0
Well 3	2,946,250	2,039,000 January 19, 2014	0	0
Well 5	3,110,400	1,525,400 July 12, 2014	0	0
Well 6	2,289,600	1,406,300 January 19, 2014	0	0

Permitted and Actual Maximum Annual Withdrawal from the Stouffville Production Wells for January 1 – December, 2014

5,197,143,750 litres	1,280,575,200 litres	25 per cent
Annual Permitted Withdrawal	Actual Annual Withdrawal	Percentage of Permitted Annual Withdrawal

System Monthly Average Flow

January	February	March	April	May	June
3,676,005	3,663,825	3,424,081	3,164,910	3,541,939	4,006,807
July	**August**	**September**	**October**	**November**	**December**
4,373,529	3,754,755	3,572,713	2,384,297	2,882,403	3,657,703

Georgina

drinking water system

[surface water – Lake Simcoe]

Georgina Water Treatment Plant (WTP) provides water to Keswick, Lakeshore communities and Sutton. A one-metre diameter intake pipe extends 1.5 kilometres out into Lake Simcoe to a depth of 19 metres and is pumped to a low lift pumping station to transfer the water to the treatment plant. Water withdrawal from the lake is regulated by a Permit to Take Water issued by the MOECC.

Raw Water Source Description

Supply for the Georgina WTP is Lake Simcoe. Local flora and fauna populations contribute to the occasional presence of coliforms or E.coli in the raw water supply. Lake Simcoe also tends to have higher levels of algae, which can occasionally create a musty taste and odour.

Water Treatment

Georgina WTP treatment processes:

- Chlorine diffusion at the intake when water temperature rises above 12 degrees Celcius to control zebra mussel growth
- Incoming water is initially screened to remove large objects
- Microfiltration treatment process (using membranes) removes suspended solids, Cryptosporidium, Giardia, as well as other potentially harmful parasites and bacteria
- Disinfection is accomplished by an ultraviolet light system and the addition of chlorine
- Granular activated carbon (GAC) improves taste and odour
- Fluoride is added prior to the water being pumped to the distribution system

Treatment processes are monitored by online analyzers equipped with alarms and automatic lockouts. Water supplied from the Georgina WTP also feeds into Sutton and Keswick distribution systems. There is one storage tower servicing the community of Sutton, and two towers and one reservoir currently servicing Keswick and lakeshore communities.

Summary of Approvals and Permits

Municipal Drinking Water License Number:	013-104
Issue Number:	Issue 4
Issue Date:	January 27, 2015
Expiry Date:	January 26, 2020
Renewal Date:	July 27, 2019
Drinking Water Works Permit Number:	013-204
Issue Number:	Issue 3
Issue Date:	January 27, 2015
Permit To Take Water Number:	4523-8TGSMJ
Issue Date:	April 24, 2012
Expiry Date:	April 23, 2022
Operational Plan Number:	013-404
Financial Plan Number:	013-301A
MOECC Waterworks Number:	260026156
System Classification:	Water Treatment III

Georgina Drinking Water System Performance Summary:

[hpc] Heterotrophic Plate Count (microbial test for general level of bacteria)

RAW	104 samples	<1 to 1 e-coli results	<1 to 150 total coliforms	n/a hpc samples	n/a hpc results
TREATED	104 samples	0 e-coli results	0 total coliforms	52 hpc samples	<1 to 620 hpc results

Average Treated Water Concentration (mg/L)	27 sodium	145 hardness	0.4 fluoride

- Turbidity (Treated) 8760 samples ranged 0.01 to 0.64 ntu [min. to max.]
- Turbidity (Raw) 8760 samples ranged 0.00 to 10 ntu [min. to max.]
- Chlorine (Free) 8760 samples ranged 0.70 to 4.90 mg/L [min. to max.]
- Fluoride 8760 samples ranged 0.2 to 1.62 mg/L [min to max]

Permitted and Actual Maximum Daily Withdrawal from the Georgina Water Treatment Plant for January 1 to December 31, 2014

Location	*Permitted Daily Withdrawal (litres)*	*Actual Maximum Daily Withdrawal (litres)*	*Number of Days Operating at Peak Capacity (May to October)*	*Number of Days Operating at Peak Capacity (Annual)*
Water Treatment Plant	50,000,000	15,633,000 June 1, 2014	0	0

Permitted and Actual Maximum Annual Withdrawal from the Georgina Water Treatment Plant for January 1 – December, 2014

18,250,000,000 litres	2,644,482,000 litres	14 per cent
Annual Permitted Withdrawal	Actual Annual Withdrawal	Percentage of Permitted Annual Withdrawal

System Monthly Average Flow

January	February	March	April	May	June
5,678,290	5,891,054	8,226,694	8,956,567	10,372,387	8,314,533
July	**August**	**September**	**October**	**November**	**December**
7,339,419	7,215,581	6,415,300	5,837,774	6,413,733	6,125,613

Georgina

[surface water – Lake Simcoe]

drinking water system
Keswick Drinking Water Sub-System

Keswick Water Treatment Plant (WTP) provides water to the community of Keswick. A 600-millimetre diameter intake pipe extends 365 metres into Cook's Bay and draws water from a depth of 8.5 metres. Water withdrawal is regulated by a Permit to Take Water issued by the MOECC.

Raw Water Source Description

Supply for Keswick WTP is surface water from Cook's Bay, Lake Simcoe. Local flora and fauna populations contribute to the occasional presence of coliforms or E.coli in the raw water supply. Lake Simcoe also tends to have higher levels of algae, which can occasionally create a musty taste and odour.

Water Treatment

Keswick WTP treatment:

- Chlorine added at the intake to limit zebra mussel growth when water temperature is over 12 degrees Celsius
- Incoming water is initially screened to remove large objects
- Carbon dioxide is added to adjust the pH for coagulation, this makes suspended particles clump together and eventually settle out in sedimentation tanks
- Granular activated carbon (GAC) improves taste and odour
- Water continues to the clearwell and ground reservoir located in the plant
- Filtered water is disinfected using chlorine and fluoride is added prior to the water being pumped to the distribution system

Treatment processes are monitored by online analyzers equipped with alarms and automatic lockouts. In addition to the water treatment plant there are two storage towers and one reservoir currently servicing Keswick and lakeshore communities.

Summary of Approvals and Permits

Municipal Drinking Water License Number:	013-104
Issue Number:	Issue 4
Issue Date:	January 27, 2015
Expiry Date:	January 26, 2020
Renewal Date:	July 27, 2019
Drinking Water Works Permit Number:	013-204
Issue Number:	Issue 3
Issue Date:	January 27, 2015
Permit To Take Water Number:	8413-994JDQ
Issue Date:	August 8, 2013
Expiry Date:	October 30, 2023
Operational Plan Number:	013-404
Financial Plan Number:	013-301A
MOECC Waterworks Number:	210003280
System Classification:	Water Treatment III Water Distribution Subsystem III

Georgina (Keswick) Drinking Water System Performance Summary:

[hpc] Heterotrophic Plate Count (microbial test for general level of bacteria)

RAW	80 samples	<1 to 2 e-coli results	<1 to 220 total coliforms	n/a hpc samples	n/a hpc results
TREATED	82 samples	0 to <1 e-coli results	0 to <1 total coliforms	41 hpc samples	<1 to 380 hpc results

Average Treated Water Concentration (mg/L)	28 sodium	145 hardness	0.4 fluoride

- Turbidity (Treated) 8760 samples ranged 0.03 to 3.00 ntu [min. to max.]
- Turbidity (Raw) 8760 samples ranged 0.07 to 19 ntu [min. to max.]
- Chlorine (Free) 8760 samples ranged 0.00 to 2.25 mg/L [min. to max.]
- Fluoride 8760 samples ranged 0.11 to 2.00 mg/L [min to max]

Permitted and Actual Maximum Daily Withdrawal from the Keswick Water Treatment Plant for January 1 to December 31, 2014

Location	*Permitted Daily Withdrawal (litres)*	*Actual Maximum Daily Withdrawal (litres)*	*Number of Days Operating at Peak Capacity (May to October)*	*Number of Days Operating at Peak Capacity (Annual)*
Water Treatment Plant	18,150,000	5,647,100 August 7, 2014	0	0

Permitted and Actual Maximum Annual Withdrawal from the Keswick Water Treatment Plant for January 1 – December, 2014

6,624,750,000 litres	851,249,427* litres	13 per cent
Annual Permitted Withdrawal	Actual Annual Withdrawal	Percentage of Permitted Annual Withdrawal

* Water treatment facility was off-line for an extended period in 2014 to complete system upgrades.

System Monthly Average Flow

January	February	March	April	May	June
3,229,365	3,321,068	1,281,586	0	86,916	2,663,877
July	**August**	**September**	**October**	**November**	**December**
3,279,784	3,286,345	3,174,010	2,853,716	2,372,300	2,496,929

Glossary of Terms

Adverse Water Quality - specifically identified in Schedule 16 of Ontario Regulation 170/03.

Chloramination - use of both chlorine and ammonia to form chloramines used for secondary disinfection.

Free Chlorine Residual - amount of chlorine available for disinfection.

Cubic Metres per Day (m^3/d) - flow measurement, $1m^3$ = 1000 litres or 220 gallons.

Disinfection - effective destruction by chemical or physical processes of pathogenic organisms capable of causing disease.

Distribution System - water supply network consisting of: pipes, water transmission mains, valves, pumping stations, storage tanks and reservoirs that deliver water from a treatment plant or well to consumers. The Region operates a 'trunk' distribution system consisting of Regional water transmission mains, pumping stations, storage tanks and reservoirs within the system.

Drinking Water System (DWS) - Ministry of the Environment and Climate Change reference for regulated Municipal Drinking Water Systems.

Drinking Water Works Permit (DWWP) - permit to establish or alter a drinking water system

E. coli (EC) - bacteria found in fecal matter that may be washed into water by rain, snowmelt and other forms of precipitation. E. coli is a type of coliform, and its presence in water indicates contamination with sewage or animal wastes. It is an indicator of the possible presence of pathogenic bacteria.

Fluoride - added to drinking water as a means to decrease the incidence of tooth decay. Fluoride can also naturally occur in the environment. Where fluoride is added to drinking water, it is recommended that the concentration be adjusted to 0.5 - 0.8 mg/L, the optimum level for control of tooth decay.

Granular Activated Carbon - used to help remove taste and odour causing compounds in drinking water.

Groundwater Under Direct Influence (GUDI) – Groundwater under direct influence of surface water. This is a provincial designation for wells that have a greater potential to be impacted by surface water and runoff. Although these wells are shallow, overlying sediments provide natural filtration capacity to sufficiently protect water quality.

Hardness - measures mineral content in water. The two minerals that are most responsible for hardness are calcium and magnesium carbonate. Water hardness can also result in scaling on pipes and appliances. Hardness levels between 80 and 100 mg/L as calcium carbonate are considered to provide an acceptable balance between corrosion and incrustation. Water supplies with a hardness greater than 200 mg/L are considered poor but tolerable.

Heterotrophic Plate Count (HPC) - a microbiological test indicating general bacteria population.

Inorganic Contaminants - such as salts and metals which can be naturally occurring or result from urban storm water run-off, industrial or domestic wastewater discharged, oil and gas production, mining or agriculture.

Iron - may be present in groundwater as a result of mineral deposits and chemically reducing underground conditions. It may also be present in surface waters as a result of anaerobic decay in sediments. Control of iron concentrations is required to avoid unpleasant colour and staining of fixtures and laundry.

Maximum Flow Rate - peak or highest flow recorded during a specific time period usually in a twenty-four (24) hour period.

Microbiological Contamination - such as viruses, bacteria or protozoa which may come from septic systems, livestock operations or wildlife.

Microfiltration Process - removes suspended solids, Cryptosporidium, Giardia, as well as other potentially harmful parasites and bacteria. Microfiltration is a membrane filtration process that removes contaminants from water by passage through a microporous membrane.

Glossary of Terms – continued

Microorganism - microscopic organism that cannot be seen without the aid of a microscope, including bacteria, protozoa, fungi, viruses and algae.

Milligram per Litre (mg/L) - measure of the concentration of a parameter in water, sometimes referred to as parts per million (ppm).

Ministry of the Environment and Climate Change (MOECC) - provincial regulatory agency responsible for overseeing the water and wastewater industry in Ontario

Medical Officer of Health (MOH) - responsible for providing direction to the Operating Authority in instances of adverse water quality instances ensures adequate responses are being followed and has the authority issue boil water advisories and orders if necessary.

Municipal Drinking Water Licence (MDWL) - approvals framework for municipal residential drinking water systems requiring an owner to have a drinking water works permit, a permit to take water, an accepted operational plan, an accredited operating authority and a financial plan.

Nephelometric Turbidity Unit (NTU) - unit of measure for turbidity in a water sample.

Ontario Drinking Water Quality Standards (ODWQS) - Ontario Regulation 169/03 under the Safe Drinking Water Act. The ODWQS lists the maximum allowable concentrations for bacteriological, organic and inorganic parameters.

Organic Chemical Contaminants - includes synthetic and volatile organic chemicals, which are by-products of industrial processes, petroleum production, gas stations, urban storm water and septic systems.

pH- index of hydrogen ion activity, pH is defined as the negative logarithm of hydrogen ion concentration in moles per litre. A solution of pH from 0-7 is acidic, 7 is neutral, and 7-14 is alkaline.

Potassium Permanganate (KMnO4) - commonly used to treat drinking water for iron, manganese and sulfur odours.

Presence/Absence Test (P/A) – qualitative procedure used to determine the presence or absence of coliforms in water.

Raw Water - surface water or groundwater that is available as a source of drinking water but has not received any treatment.

Sodium - found naturally in surface and groundwater as it is present in most rocks and soils across southern Ontario. Sodium has no smell or colour, however it can make the water taste salty at certain levels. The aesthetic objective for sodium in drinking water is 200 mg/L at which it can be detected by a salty taste. The local Medical Officer of Health is notified when the sodium concentration exceeds 20 mg/L.

Sodium Hypochlorite - used for disinfection in drinking water.

Sodium Silicate - used to sequester iron in drinking water (to reduce the potential for iron to stain plumbing fixtures).

Total Coliform (TC) - coliform group of bacteria has been the most commonly used indicator of water quality. Total coliforms are a group of closely related bacteria that are usually free-living in the environment, but are also normally present in water contaminated with human and animal feces. With certain exceptions, they do not cause disease. Specifically, coliforms are used as a screen for fecal contamination as well as to determine the efficiency of treatment and the integrity of the water distribution system.

Treated Water - water entering the distribution system after the treatment is complete.

Turbidity - measure of relative clarity of a liquid, the presence of suspended matter or impurities that interfere with the clarity of the water. The more total suspended solids in the water, the cloudier it seems and the higher the turbidity.

Ultraviolet Disinfection (UV) - form of disinfection used in the water and wastewater industry, ultraviolet treatment uses the transmittance of ultraviolet irradiation to disrupt the genetic composition and inactivate waterborne pathogens.

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Explanations on the health impacts of laboratory results of inorganic and organic parameters can be found in MOECC document#4449e01, *Technical Support Document for Ontario Drinking Water Quality Standards, Objectives and Guidelines*.
www.ene.gov.on.ca/stdprodconsume/groups/lr/@ene/@resources/documents/resource/std01_079707.pdf

Environmental Services Department
Administrative Centre - 1st Floor
17250 Yonge Street, Newmarket, ON CAN L3Y 6Z1
P: 905-830-4444 | TF: 1-877-449-9675
Extension 73000 | www.york.ca

Attachment 2

Summary of Reported Adverse Water Quality Parameter Results in 2014

Location	Parameter	Event Date (2014)	Limit	Result	Corrective Action
Sutton ET	Sodium	Jan 6	20.0 mg/L	25.9 mg/L	Resample taken per regulations, result 26.2 mg/L
King City Dufferin St. ET	Sodium	Jan 15	20.0 mg/L	23.4 mg/L	Resample taken per regulations, result 16.9 mg/L
Richmond Hill PS	Total Coliforms	Mar 17	0 CFU /100mL	1 CFU /100mL	Resampled per regulations, result 0 CFU/100 mL.
Richmond Hill Coons Rd. ET	Sodium	Apr 2	20.0 mg/L	21.5 mg/L	Resample taken per regulations, result 23.4 mg/L
Aurora Ridge Rd. Reservoir	Sodium	Apr 2	20.0 mg/L	20.3 mg/L	Resample taken per regulations, result 22.2 mg/L
West Woodbridge ET	Sodium	Apr 22	20.0 mg/L	20.3 mg/L	Resample taken per regulations, result 18.9 mg/L
Schomberg ET	Nitrite	Aug 6	1.0 mg/L	1.67 mg/L	Resample taken per regulations, result 0.482 mg/L
Georgina WTP	Sodium	Oct 1	20.0 mg/L	26.3 mg/L	Resample taken per regulations to, result 26.5 mg/L
Queensville ET	Sodium	Oct 15	20.0 mg/L	20.2 mg/L	Resample taken per regulations, result 20.5 mg/L
Nobleton Well 3	Sodium	Oct 22	20.0 mg/L	20.5 mg/L	Resample taken per regulations, result 20.3 mg/L
Holland Landing East ET	Sodium	Oct 22	20.0 mg/L	23.4 mg/L	Resample taken per regulations, result 21.7 mg/L
Holland Landing Well 2	Sodium	Oct 22	20.0 mg/L	23.4 mg/L	Resample taken per regulations, result 23.6 mg/L
Ansnorveldt Well 2, 3	Sodium	Oct 22	20.0 mg/L	40.6 mg/L	Resample taken per regulations, result 40.5 mg/L

Attachment 3

Summary of Reported Adverse System Performance Events in 2014

Location	Parameter	Event Date (2014)	Limit	Result	Corrective Action
Nobleton Well 3	Chlorine Residual Free	Mar 16	0.05 – 4.00 mg/L	0.00 mg/L	Chlorine analyzer malfunctioned and was repaired, reported as a due diligence measure. Sample taken, result 1.83mg/L.
Sutton ET	Chlorine Residual Free	May 20	0.05 – 4.00 mg/L	0.00 mg/L	Resampled per regulations, result 0.71 mg/L. System was flushed as a safety precaution.
Newmarket Well 1	Chlorine Residual Combined	May 31	0.25 – 3.00 mg/L	0.22 mg/L	Resampled per regulations, result 0.71 mg/L. Staff reported as a due diligence measure
Holland Landing Well 2	Contact Time	May 31	Varies based on volume	0.12 mg/L	Well was placed in “OFF” position and not delivering water to the distribution system until proper disinfection rates were restored.
Newmarket Northeast ET	Chlorine Residual Combined	Jun 3	0.25 – 3.00 mg/L	0.24 mg/L	Additional chlorinated water was added from the distribution system until chlorine residual levels were within required limits
Keswick WTP Clearwell	Fluoride	Jun 29	0 – 1.5 mg/L	1.69 mg/L	Corrective action taken and resampled. Resample result 0.69 mg/L. Operating procedures were reviewed and updated to avoid issues in the future.
Holland Landing West ET	Chlorine Residual Combined	Jul 20	0.25 – 3.00 mg/L	4.5 mg/L	Chlorine analyzer malfunctioned and was repaired, reported as a due diligence measure. Sample taken, result 1.45 mg/L.
Georgina WTP Clearwell	Fluoride	Jul 28	0 – 1.5 mg/L	1.58 mg/L	Corrective action taken and resampled. Resample result 0.69 mg/L. Operating procedures were reviewed and adjusted to avoid issues in the future.

Keswick WTP Clearwell	Turbidity	Aug 21	1 NTU	3NTU	Corrective action taken. Resample result 0.16 NTU.
Schomberg WTP	System Pressure	Dec 1	>20psi	0 psi	Reported as a Best Management Practice as a due diligence measure as this is not a legislated requirement. Corrective action taken to restore pressure.

Attachment 4

Ministry of Environment and Climate Change Inspection Results Summary

Drinking Water System	Rating	Findings	Corrective Action
York Drinking Water System – Queensville	95.88%	*Non-compliance*: Two instances where samples for turbidity were collected more than 40 days apart	Regulatory relief has been granted to permit the Region to use continuous monitoring results for treated water turbidity
		Non-compliance: Adverse water quality incident (combined chlorine residual) was not immediately reported	Provided additional operator training on related procedures Procedure developed to support manual operation of wells. Site specific reference material to identify reportable chlorine analyzers posted in each system
		Best Practice: Continuous monitoring equipment not measuring and recording for the first 15 minutes following manual well start-up	Regulatory relief has been granted for this requirement.
		Best Practice: Instance where review of continuous monitoring test results did not identify an adverse water quality incident within 72 hours of the incident	Implemented a daily SCADA review with a 24 hour trending frequency
Mount Albert	100%	*Non-compliance*: Two instances where samples for turbidity were collected more than 40 days apart	Regulatory relief has been granted to permit the Region to use continuous monitoring results for treated water turbidity
Ballantrae/ Musselman's Lake	100%	*Non-compliance*: Two instances where samples for turbidity were collected more than 40 days apart	Regulatory relief has been granted to permit the Region to use continuous monitoring results for treated water turbidity

York Drinking Water System – Stouffville	100%	*Best Practice*: Raw turbidity grab sample information was recorded in the logbooks but not easily accessible to the inspector and the public	Regulatory relief has been granted for this parameter however, staff are continuing to investigate options for enhanced access to data using automated business tools.
York Drinking Water System – Holland Landing	95.24%	*Non-compliance*: An adverse water quality incident (high chloramine) was not reported immediately *Non-compliance*: Logbook entries did not reflect adverse water quality incident (high combined residual) *Best Practice*: Continuous monitoring equipment not measuring and recording for the first 15 minutes following manual well start-up *Best Practice*: Instance where review of continuous monitoring test results did not identify an adverse water quality incident within 72 hours of the incident	Provided additional operator training on related procedures Procedure developed to support manual operation of wells. Site specific reference material to identify reportable chlorine analyzers posted in each system Regulatory relief has been granted for this requirement. Implemented a daily SCADA review with a 24 hour trending frequency
Ansnorveldt	100%	None	N/A
York Drinking Water System – Aurora	100%	*Best Practice*: Continuous monitoring equipment not measuring and recording for the first 15 minutes following manual well start-up	Regulatory relief has been granted for this requirement.
Georgina Drinking Water System – Georgina	100%	None	N/A
Georgina Drinking Water System – Keswick	100%	*Best Practice:* Keswick Water Treatment Plant has one more fixed screen than noted in the current Drinking Water Works Permit	Administrative change was made when Municipal Drinking Water Licence was renewed

York Drinking Water System – Newmarket	95.21%	*Non-compliance*: Two adverse water quality incident (high chloramine) was not reported immediately	Provided additional operator training on related procedures Procedure developed to support manual operation of wells. Site specific reference material to identify reportable chlorine analyzers posted in each system
		Best Practice: Continuous monitoring equipment not measuring and recording for the first 15 minutes following manual well start-up	Regulatory relief has been granted for this requirement.
York Drinking Water System – King City	100%	None	N/A
York Drinking Water System – Kleinburg	100%	None	N/A
York Drinking Water System – York Distribution	100%	None	N/A
Nobleton	100%	None	N/A
Schomberg	100%	None	N/A

Operational Excellence
for Water and Wastewater Services

Presentation to
Committee of the Whole

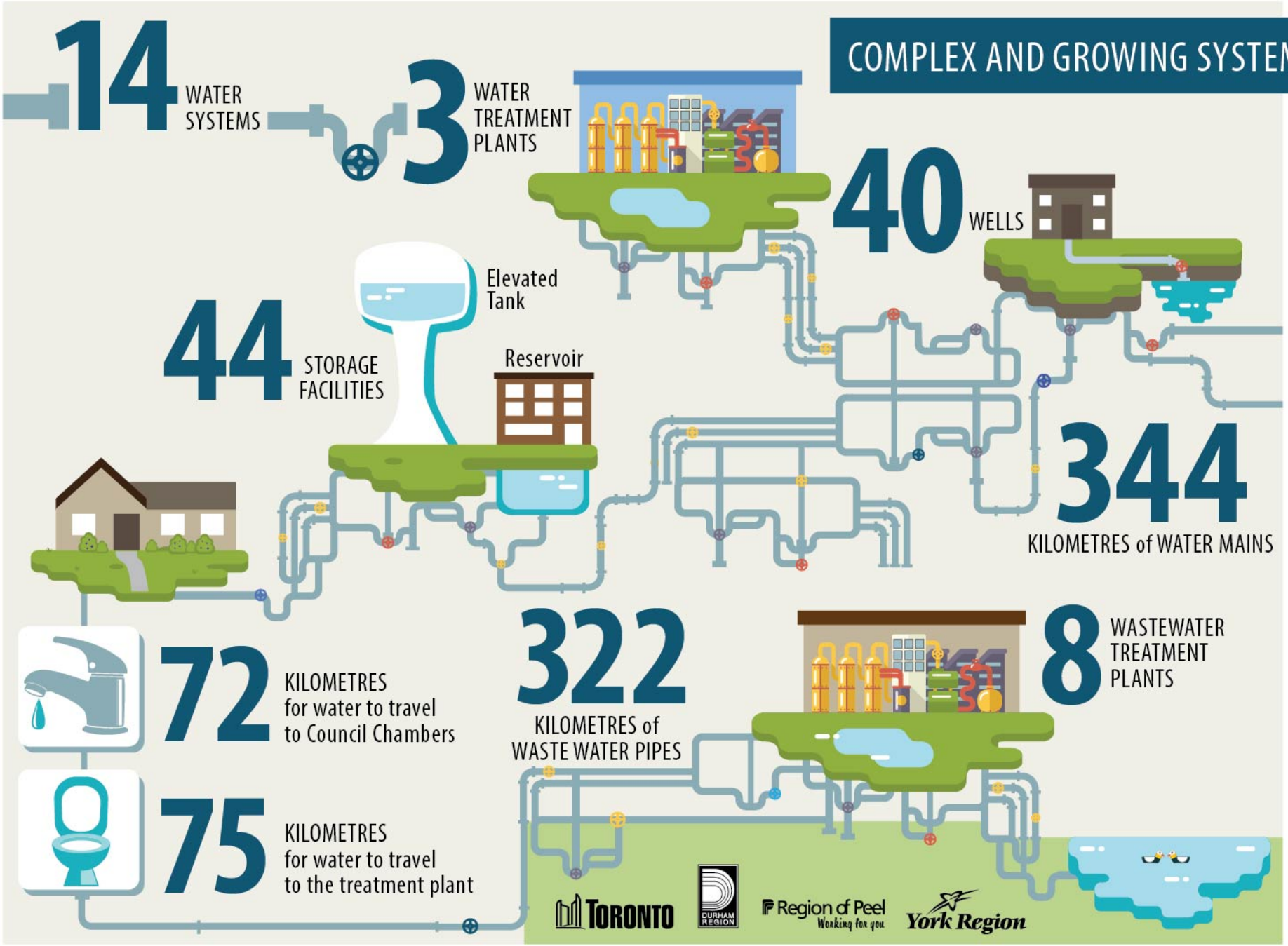
David Szeptycki and Brett Bloxam

March 12, 2015

Overview

- Proactively managing risk to support regulatory compliance
- IMS Update
- Summary of drinking water quality results for 2014
- Reporting requirement of the Safe Drinking Water Act
- Operations Maintenance and Monitoring Achievements

Providing high quality drinking water to our communities through programs designed to meet Ontario's regulatory requirements for drinking water


COMPLEX AND GROWING SYSTEM
14 WATER SYSTEMS
3 WATER TREATMENT PLANTS
40 WELLS
Elevated Tank
44 STORAGE FACILITIES
Reservoir
344 KILOMETRES of WATER MAINS
72 KILOMETRES for water to travel to Council Chambers
322 KILOMETRES of WASTE WATER PIPES
8 WASTEWATER TREATMENT PLANTS
75 KILOMETRES for water to travel to the treatment plant
TORONTO
DURHAM REGION
Region of Peel Working for you
York Region

Council Responsibilities

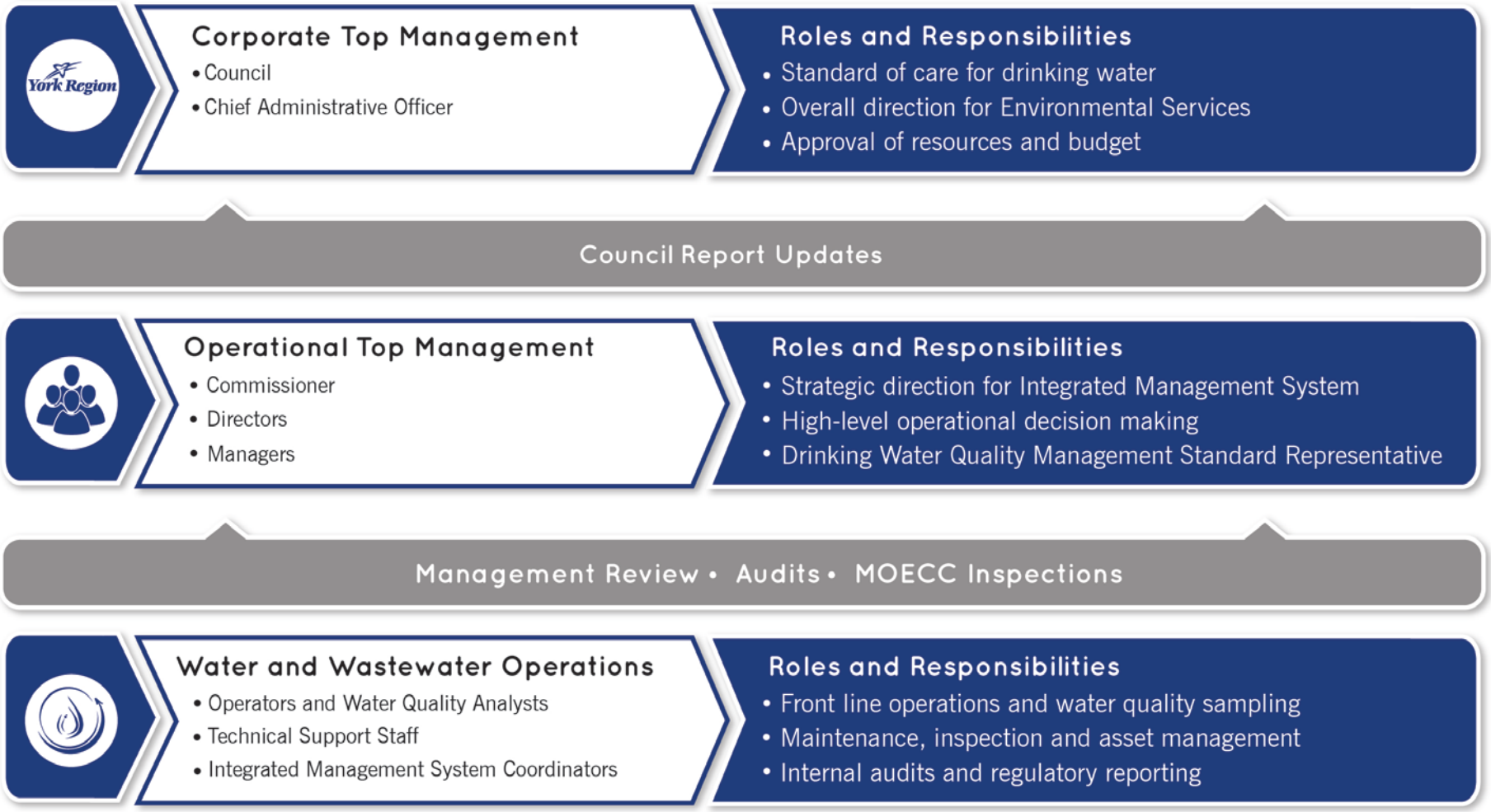
Statutory Standard of Care – Safe Drinking Water Act, 2002

- Integrated Management System comprehensively manages risk
  - Drinking Water Quality Management Standard
  - ISO 9001 Quality Management Standard
  - ISO 14001 Environmental Management Standard
- Drinking Water Summary Report
  - Provides water quality and quantity information to inform Standard of Care
  - Meets requirements under Sec. 11 and Sch. 22 of Safe Drinking Water Act

Environmental Services well positioned to meet regulatory requirements and beyond

Integrated Management System (IMS) Update

ISO 9001/14001 and Drinking Water Quality Management Standard help mitigate risk to deliver high quality services



DWQMS provides framework of accountability to deliver safe drinking water

Proactively Managing Risk and Compliance

- Consistent practices through operating and emergency procedures
- Periodic documentation review and updates
- Centralized administration of compliance
- Monitoring of certification and training
- Identification and management of risks

Comprehensive system with documentation, training and audit oversight to deliver high quality services

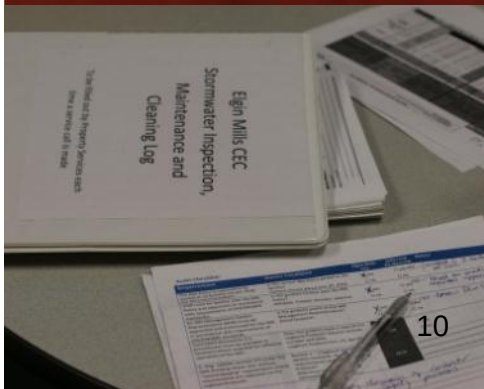
Comprehensive Audit Program

System	Internal Audits	Compliance Audits	External Audits
Water	29	29	6
Wastewater	6	14	7
Waste Management	3	3	3
TOTAL	**38**	**46**	**16**

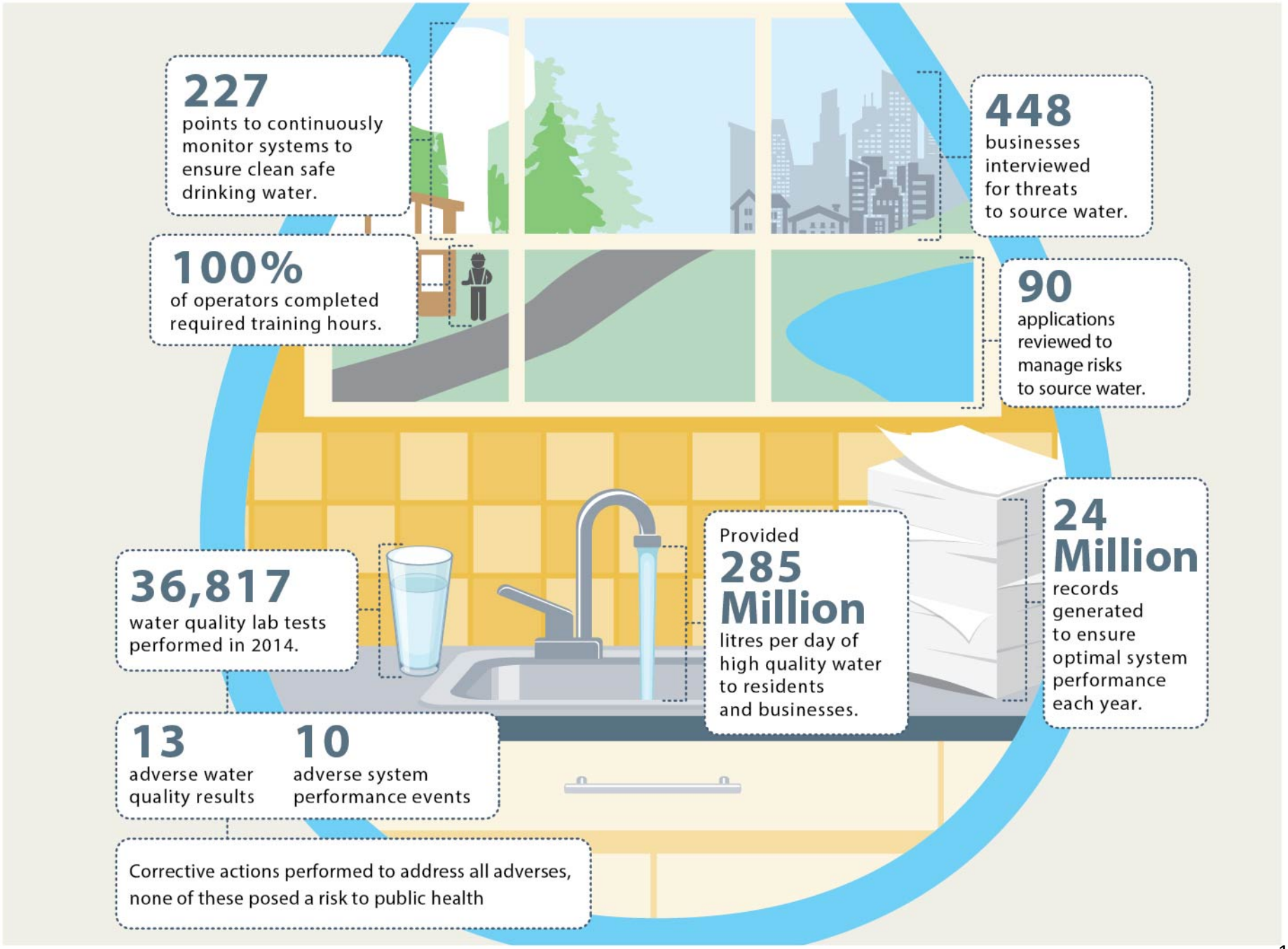
Integrated Management System is Council's safeguard to achieving Statutory Standard of Care responsibilities

Continuous Improvement

- 2014 initiatives support efficiency, cost savings and enhanced system performance
- Completed initiatives include:
  - Water and wastewater sample program review
  - Redeployment of staff to priority program areas such as adverse water quality event reporting
  - Upgraded document management process, requiring less time to maintain
  - Integration activities to include additional Environmental Services business areas into scope of registration
- Conduct annual management review meeting




Annual
Drinking Water
Quality Report


227
points to continuously monitor systems to ensure clean safe drinking water.
448
businesses interviewed for threats to source water.
100%
of operators completed required training hours.
90
applications reviewed to manage risks to source water.
24 Million
records generated to ensure optimal system performance each year.
Provided
285 Million
litres per day of high quality water to residents and businesses.
36,817
water quality lab tests performed in 2014.
13
adverse water quality results
10
adverse system performance events
Corrective actions performed to address all adverses, none of these posed a risk to public health

Water Quality Sample and Performance Results

Adverse Water Quality Results

Parameter	Number of Events
Sodium	11
Coliforms	1
Nitrate	1
TOTAL	**13**

Adverse System Performance Events

Parameter	Number of Events
Chlorine	5
Fluoride	2
Contact Time	1
Turbidity	1
System Pressure	1
TOTAL	**10**

Over 24 million records of continuous monitoring of drinking water and wastewater systems

MOECC Inspections – Water and Wastewater

System	Year	# MOECC Inspections Completed	# Non-Compliance Findings	# Best Practice Recommendations
Water	2014	15	7	8
Wastewater	2014	1	2	0

- Inspections resulted in high overall inspection ratings
- All non-compliance and best practice recommendations were followed up on with appropriate corrective actions including:
  - Successful application and approval to use continuous monitoring for turbidity and chlorine
  - Operator training
  - Updated protocols and procedures

100% York Region's Drinking Water Systems operated within allowable flow and withdrawal limits set by MOECC issued Permits to Take Water

Ontario Chief Drinking Water Inspector's Annual Reports 2011-2013

Municipality	Inspection Rating (%)		Water Quality (% Tests Meeting Standards)	
	2011 - 2012	2012 - 2013	2011 - 2012	2012 - 2013
York	**100**	**100**	**100**	**100**
Durham	99.83	100	99.90	99.96
Halton	98.78	100	99.95	99.99
Peel	99.59	99.35	99.97	99.96
Toronto	99.42	98.38	99.89	99.91

York Region perfect in 2012 – 2013
Ontario Chief Drinking Water Inspector's report


Operations
Maintenance and
Monitoring
Achievements

Key Achievements for Operations Maintenance and Monitoring in 2014

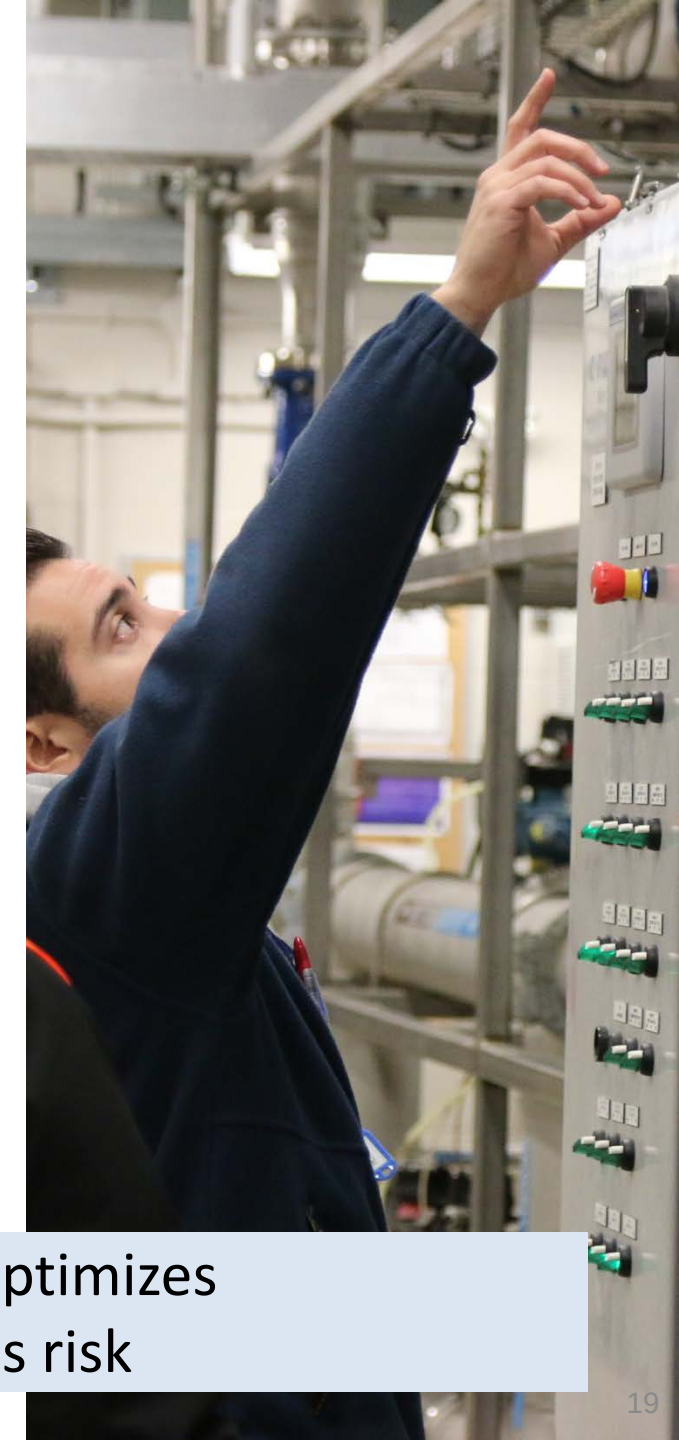
Leveraging Efficient and Effective Operations

- Implementation of 24/7 shift to increase coverage
- Strong business continuity plans to respond to emergencies due to climate change
- Continuous improvement and reliability teams created to provide support to front line
- Multi-barrier approach to manage risk

Using data and key performance indicators for continuous improvement of operations

Operational Excellence
in a Highly Regulated Business

- Continue to achieve industry leading top marks for MOECC inspections
- Leveraging data to make evidence based decisions
- Continue to maintain compliance while operating facilities during construction of complex capital projects



Technology and automation optimizes staff resources and reduces risk

Fiscal Responsibility to Manage Costs

- Driving out costs through review of program activities and optimization of business processes
- Savings in standby and overtime costs by realigning business
- Implementation of proactive maintenance strategy reduces costs and increases reliability of assets
- Process optimization to manage increasing energy and chemical costs
- Review of sampling, training and purchasing programs to save costs

Operations Maintenance and Monitoring is responsible for maintaining assets valued at nearly $4 billion

Industry Leadership and Best Practices

- Key partnerships with University of Toronto and Water Research Foundation
- Collaboration with local municipalities to develop operating strategies, data sharing and service level agreements
- Participation on industry committees to leverage industry best practices

UNIVERSITY OF TORONTO

DWRG NSERC CHAIR IN DRINKING WATER RESEARCH

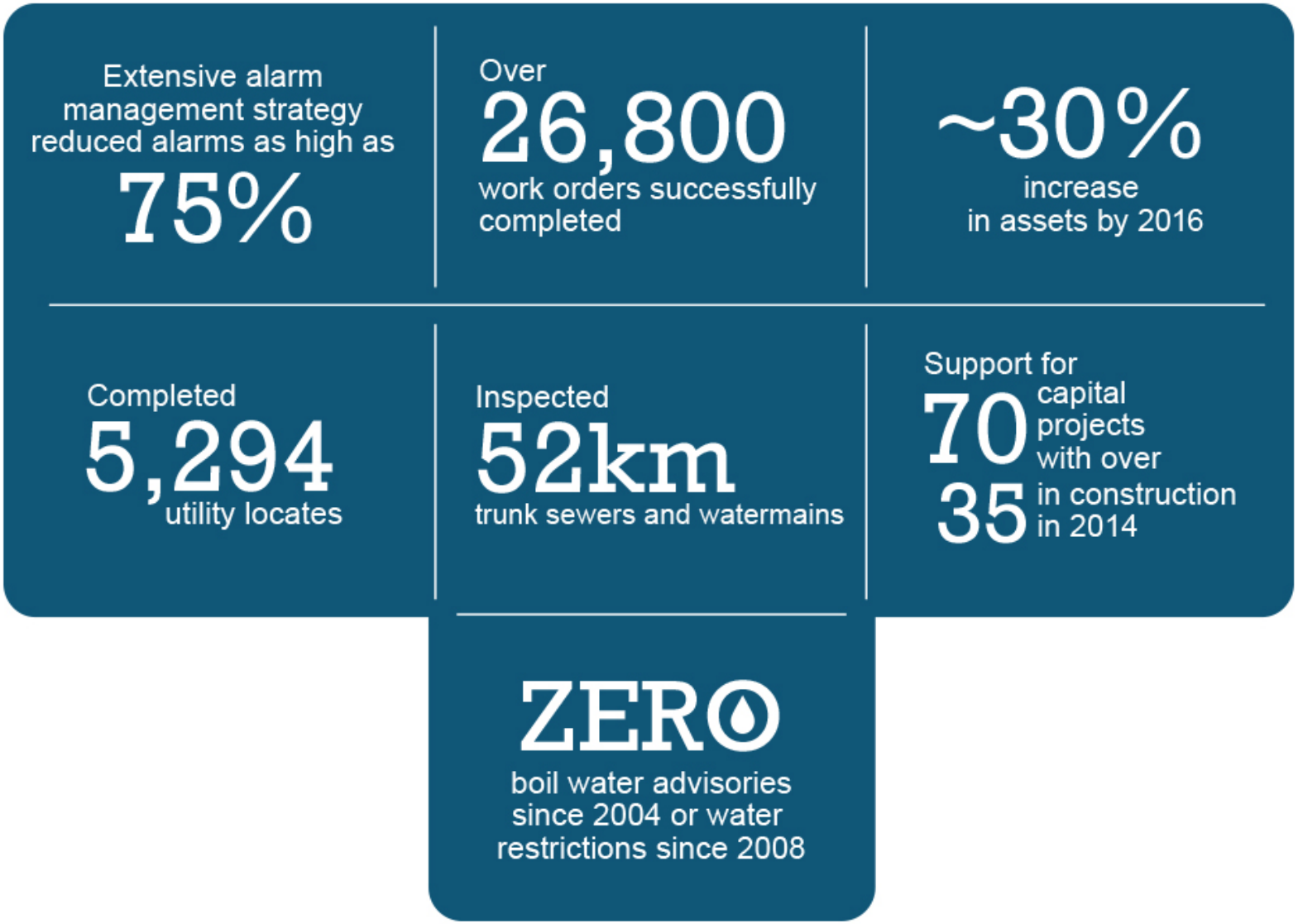
Water Research Foundation advancing the science of water

Operating in a Complex Environment

- Increased focus by MOECC on wastewater inspections using rigorous water inspection methodology
- Developed succession plans to retain and attract trained staff in a competitive market
- Increasing focus on asset condition and maintenance practices to understand risk and consequence of system failures

Operations well positioned to successfully tackle complex challenges delivering water and wastewater services

Delivering Essential Services to Our Customers



Meeting Changing Customer Expectations

- Public understanding of complex business
- Reliable and resilient 24/7 services
- Essential service for community growth and well being
- Protect public health and the environment
- Deliver Council commitments and Statutory Standard of Care

“The most important health care provider in your community is the person who takes care of the water.”

Bernadette Conant, Executive Director of Canadian Water Network