Accessible formats or communication supports are available upon request. Please contact AccessYork@york.ca or call 1-877-464-9675.

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

York Region is responsible for the supply, production, treatment, storage and transmission of drinking water to its nine partner 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 distribute the high quality drinking water to residential, industrial, commercial and institutional customers within their communities.

York Region provides residents and businesses with safe uninterrupted drinking water supply by operating and maintaining:

- Three water treatment plants
- 45 water storage facilities (elevated tanks and reservoirs)
- 40 production wells
- Approximately 350 kilometres of transmission mains

York Region is also committed to effective wastewater treatment to protect sources of drinking water, and maintains:

- Seven water resource recovery facilities and one lagoon system
- Partnership with Durham Region on ownership, use and management of the Duffin Creek Plant
- 21 sewage pumping stations
- Approximately 330 kilometres of sewer mains

York Region’s three drinking water sources include:

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

This report summarizes quantities and flow rates of the drinking water supplied by York Region’s drinking water systems during the 2016 calendar year as part of the Region’s reporting requirements under the Safe Drinking Water Act, 2002 (Safe Drinking Water Act).
Keeping Our Drinking Water Safe

300 ANALYZERS to continuously monitor systems to ensure drinking water is safe

31 MILLION RECORDS generated to ensure optimal system performance

18,489 water quality lab tests performed in 2016

336 MILLION LITRES per day of high quality water provided to residents and businesses

58 risk management plans in place

2 approved source protection plans

2016 Results
Meeting and Exceeding Our Requirements

All Ontario municipal drinking water systems must report drinking water quality and quantity information under the Safe Drinking Water Act. An annual report to Council, including this summary report, along with water quality reports posted on york.ca/drinkingwater, fulfill the Region’s annual regulatory reporting obligations.

York Region follows a “One Water” philosophy adopted by many industry leaders around the world, which recognizes that the same water is cycled throughout all uses on Earth and must be protected at all points in the water cycle. In addition, regulations require the Region to protect sources of municipal drinking water. Proactive risk management is carried out every day by:

- Following a multi-barrier approach to ensure drinking water is kept clean, safe and reliable
- Complying with legislation designed to protect public health through clean drinking water
- Planning and constructing infrastructure to meet the needs of the growing Region
- Preventing service interruptions by maintaining well systems for supplemental water capacity
- Driving innovation by hosting progressive research programs and securing strategic partnerships with industry and research leaders
- Completing thousands of tests and using highly sophisticated real-time monitoring to help ensure that drinking water meets quality standards
- Delivering comprehensive training programs, ensuring operators continue to achieve excellence in drinking water operations and are prepared for future challenges
- Maintaining an integrated management system to monitor compliance and drive continuous improvement, including the Drinking Water Quality Management Standard (DWQMS), ISO 9001 and ISO 14001

In 2016, 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 and Municipal Drinking Water Licenses issued by the Ministry of the Environment and Climate Change, as well as supply agreements for water purchased from the City of Toronto and Peel Region.

York Region uses continuous monitoring analyzers to keep track of critical processes and conducts a comprehensive sampling program that exceeds regulatory requirements. In 2016:

- 18,489 laboratory analyzed tests were performed on water quality samples, which resulted in 25 adverse results, meaning 99.87 per cent of all tests met the regulated standards.
- Approximately 31 million readings were recorded by 300 continuous monitoring analyzers for operating parameters such as disinfection, pressure, or turbidity. 89 of these system performance readings were reported as adverse events.

Adverse events are reported to the Ministry of the Environment and Climate Change and the Region’s Medical Officer of Health, as required by the Safe Drinking Water Act. An adverse event does not necessarily indicate that drinking water is unsafe – it indicates a parameter has fallen outside the normal operating range and corrective action must be taken. None of the events that occurred in 2016 posed a threat to public health, and no additional corrective actions were directed by the Ministry of the Environment and Climate Change or the Region’s Medical Officer of Health.
Sources of York Region Drinking Water 2016

90% Lake Ontario
30% Peel Region Supply
60% City of Toronto Supply

7% York Region Groundwater
3% Lake Simcoe

York Region Drinking Water Performance Review 2016

Total number of tests 18,489
- Microbiological Samples 8,272
- Inorganic Samples 3,544
- Organic Samples 6,673

99.87% of all samples met regulated standards

122 billion litres of water delivered
Multi-Barrier Approach Helps Protect Drinking Water

York Region uses a multi-barrier approach to ensure safe operation of its drinking water systems. The multi-barrier approach is a key recommendation from the Walkerton Inquiry, which resulted in some of the strictest regulations in the world for protecting public health through drinking water. The multi-barrier approach is an internationally recognized system of procedures, processes and tools that create a series of barriers to prevent contamination and provide high-quality drinking water.

The multi-barrier approach protects water from source, to tap, and back to source. Barriers ensuring safe, clean drinking water can be classified into the four broad categories below:

1. Protecting the Source

- **Monitoring Area** – Staff regularly test the extensive network of groundwater monitoring stations to evaluate potential changes in water quality and quantity that may impact Region drinking water supplies.

- **Protecting Quality** – the Region works with its partner local municipalities and other Regional departments to protect vulnerable areas through land use restrictions, zoning bylaws, prohibiting significant activities as required under the *Clean Water Act, 2002*, and by establishing impact assessment and mitigation plans. Risk management plans also are negotiated with farmers and businesses, with inspections to assist compliance and monitor effectiveness. Source protection plans are maintained for South Georgian Bay Lake Simcoe and Credit Valley, Toronto and Central Lake Ontario.

- **Preserving Water Quantity** – Staff assess risk to groundwater reserves in response to population demand, reduced recharge (refilling) of aquifers due to development that encourages runoff, and drought due to inconsistent precipitation resulting from climate change.

2. Processes to Treat and Manage Water

- **Robust Water Treatment** – Helps ensure drinking water meets regulatory requirements on a continual basis, often using multiple steps to treat drinking water, eliminate potentially harmful organisms and provide safe, clean drinking water to our customers.

- **Secure Water Distribution Network** – Once water is treated, the Region works with its partner local municipalities to ensure water is distributed to customers in a manner which maintains quality all the way to the tap. York Region works actively with local municipalities, the City of Toronto and Peel Region to ensure the security and integrity of the distribution system.

- **Effective Wastewater Treatment** – Wastewater is collected and treated with enhanced treatment technologies and performance monitoring to remove contaminants before being returned to the environment. Partnerships with Durham Region and Peel Region provide economies of scale for wastewater treatment, and position York Region as an industry leader.

3. System Monitoring

- **Monitoring and Testing** – Ensuring water quality is maintained from source to tap by monitoring processes and water quality through sophisticated continuous monitoring and lab tests. York Region gathered 31 million continuous monitoring records and 18,489 lab test results in 2016 to help ensure drinking water is clean and safe.

- **Management and Oversight** – Administration of standards through an integrated management systems, which help maintain guidelines and standards through defined processes and performance monitoring.
Multi-Barrier Approach - continued

4. Policy and Development:

- **Public Awareness** – Education on how to protect sources of drinking water and encourage conservation. The Region promotes awareness in a number of ways, including educational campaigns and outreach activities. Visit york.ca/wateris for more information.

- **Legislative and Policy Frameworks** – Compliance with Provincial legislation and regulations that drinking water and wastewater are required to meet such as the Safe Drinking Water Act and the *Ontario Water Resources Act, 1990*. York Region also maintains interdepartmental and intermunicipal advocacy groups to help shape new or amended legislation.

- **Guidelines, Standards, and Objectives** – Tools that guide the operation of processes to treat and manage drinking water and wastewater. York Region is accredited under the Provincial Drinking Water Quality Management Standard and is also registered to ISO 9001 and ISO 14001.

- **Research, Science, and Technology** – Innovation in science to help better understand the quality of water and technology to improve processes that treat and manage water. York Region continues to optimize our treatment processes by collaborating with external government partners and university researchers.
# Summary of Communities supplied by York Region Drinking Water Systems

Table 1 – Communities served by Drinking Water Systems

<table>
<thead>
<tr>
<th>Drinking Water System (Source)</th>
<th>Local Community</th>
<th>Local Municipal Water Distributor</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ansnorveldt Drinking Water System (Groundwater)</td>
<td>Ansnorveldt Township of King</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Ballantrae-Musselman’s Lake Drinking Water System (Groundwater)</td>
<td>Ballantrae Town of Whitchurch-Stouffville</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>Musselman’s Lake Wayne Township</td>
<td>14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mount Albert Drinking Water System (Groundwater)</td>
<td>Mount Albert Town of East Gwillimbury</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Nobleton Drinking Water System (Groundwater)</td>
<td>Nobleton Township of King</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>Schomberg Drinking Water System (Groundwater)</td>
<td>Schomberg Township of King</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>York Drinking Water System (Lake Ontario only)</td>
<td>Maple City of Vaughan</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>Markham City of Markham</td>
<td>22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Richmond Hill Town of Richmond Hill</td>
<td>22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vaughan City of Vaughan</td>
<td>22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Woodbridge City of Vaughan</td>
<td>22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>York Drinking Water System (Lake Ontario &amp; Groundwater)</td>
<td>Aurora Town of Aurora</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>Holland Landing Town of East Gwillimbury</td>
<td>26</td>
<td></td>
<td></td>
</tr>
<tr>
<td>King City King Township</td>
<td>28</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kleinburg City of Vaughan</td>
<td>30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Newmarket Town of Newmarket</td>
<td>32</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Queensville Town of East Gwillimbury</td>
<td>34</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sharon Town of East Gwillimbury</td>
<td>34</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stouffville Town of Whitchurch-Stouffville</td>
<td>36</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Georgina Drinking Water System (Lake Simcoe)</td>
<td>Keswick Town of Georgina</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>Sutton Town of Georgina</td>
<td>38</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
York Region Drinking Water Systems (DWS)

1. Ansnorveldt DWS
2. Ballantrae/Musselman’s Lake DWS
3. Mount Albert DWS
4. Nobleton DWS
5. Schomberg DWS
6. York Drinking Water System
7. King City Sub-system YDWS
8. Kleinburg Sub-system YDWS
9. Aurora Sub-system YDWS
10. Holland Landing Sub-system YDWS
11. Newmarket Sub-system YDWS
12. Sharon/Queensville Sub-system YDWS
13. Stouffville Sub-system YDWS
14. Georgina DWS
15. Keswick DWS

SOURCE
- Blue: Groundwater (Regional)
- Gray: Groundwater (Regional) and Lake Ontario
- Green: Lake Simcoe
- Pink: Lake Ontario

Kilometers
0 2.5 5 10

York.ca | 11
Ansnorveldt is located in northeastern King Township within the Holland Marsh. The residential community served by the Ansnorveldt Drinking Water System is centred around Dufferin Street, north of Highway 9. York Region manages the water supply of two wells and one pumping station. The Township of King maintains and distributes water to consumers from the Regional Supply.

**Raw Water Source Description**
Water taking is regulated by a Permit to Take Water issued by the Ministry of the Environment and Climate Change. Two wells extract groundwater from a deep aquifer. Iron, manganese and hardness levels are naturally elevated, which is common in deep aquifers across York Region. Staff use raw water test results to monitor the health of the aquifer and determine the best water treatment.

**Water Treatment and Supply**
The two wells are located in one pumphouse. Water is disinfected with chlorine (sodium hypochlorite). No other treatments are applied. Water from the wells blends with the disinfectant, and is pumped to two small, on site storage facilities. Pumps deliver the treated water to the local distribution system.

In addition to routine water testing and facility inspections by Operators, online analyzers continuously monitor the treatment and delivery processes. These analyzers trigger alarms and automatically shut down and lockout pumps to notify Operators when immediate attention is needed on site.

**Summary of Approvals and Permits**

- **Municipal Drinking Water Licence Number**: 013-108  
  **Issue Date**: January 27, 2015  
  **Expiry Date**: January 26, 2020
- **Drinking Water Works Permit Number**: 013-208  
  **Issue Date**: January 27, 2015  
  **Expiry Date**: January 26, 2020
- **Permit to Take Water Number**: 8037-94XPXR  
  **Issue Date**: March 15, 2013  
  **Expiry Date**: December 31, 2021
- **Operational Plan Number**: 013-408
- **Financial Plan Number**: 013-308A
- **MOECC Waterworks Number**: 260002213
<table>
<thead>
<tr>
<th>2016 Treated Water Tests</th>
<th>Hardness</th>
<th>Sodium</th>
<th>Fluoride</th>
<th>Chlorine</th>
<th>E. coli</th>
<th>Total Coliforms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Results</td>
<td>112 mg/L</td>
<td>41 mg/L</td>
<td>0.25 mg/L</td>
<td>1.58 mg/L</td>
<td>Not Detected</td>
<td>Not Detected</td>
</tr>
</tbody>
</table>

**Permitted and Actual Maximum Daily Withdrawal from the Ansnorveldt Production Wells for January 1 to December 31, 2016**

<table>
<thead>
<tr>
<th>Location</th>
<th>Permitted Daily Withdrawal (litres)</th>
<th>Actual Maximum Daily Withdrawal (litres)</th>
<th>Days Operating at Peak Capacity (May to October)</th>
<th>Number of Days Operating at Peak Capacity (Annual)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well 2</td>
<td>184,320</td>
<td>85,141</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Well 3</td>
<td>115,200</td>
<td>48,227</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Withdrawal from the Ansnorveldt Production Wells Jan. 1 to Dec. 31, 2016**

- Actual Annual Withdrawal: 15,639,777 litres
- Annual Permitted Withdrawal: 109,324,800 litres
- Percentage of Permitted Annual Withdrawal: 14 per cent

**System Monthly Average Flow (litres per day)**

- January: 33,875
- February: 32,656
- March: 36,027
- April: 37,136
- May: 47,171
- June: 62,655
- July: 52,650
- August: 47,832
- September: 43,054
- October: 38,895
- November: 38,727
- December: 41,797
Ballantrae and Musselman’s Lake are located within the Town of Whitchurch-Stouffville, centred on Aurora Road around Highway 48 and Ninth Line. York Region manages the water supply of three wells and one elevated storage tank. The Town of Whitchurch-Stouffville maintains and distributes the water to consumers from the Regional Supply.

**Raw Water Source Description**
Water taking is regulated by a Permit to Take Water (PTTW) issued by the Ministry of the Environment and Climate Change. The PTTW for Ballantrae-Musselman’s Lake expired in March 2016. The Region is helping the Ministry assess water table levels in the area by providing monitoring data. The Ministry has instructed the Region to follow the conditions of the expired permit until the assessment is complete, at which point a new PTTW will be issued.

Three wells extract groundwater from a deep aquifer. Iron, manganese and hardness levels are naturally elevated, which is common in deep aquifers across York Region. Staff use raw water test results to monitor the health of the aquifer and determine the best water treatment.

**Water Treatment and Supply**
Disinfection is maintained with chlorine. Wells 1 and 2 are disinfected with sodium hypochlorite. Water from Well 3 is disinfected with chlorine gas. Sodium silicate is added to manage iron and manganese in the distribution system. The storage facility holds water for peak demand use, and maintains pressure in the system.

In addition to routine water testing and facility inspections by Operators, online analyzers continuously monitor the treatment and delivery processes. These analyzers trigger alarms and automatically shut down and lockout pumps to notify Operators when immediate attention is needed on site.

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**Summary of Approvals and Permits**

**Municipal Drinking Water Licence Number:** 013-106  
**Issue Date:** January 27, 2015  
**Expiry Date:** January 26, 2020

**Drinking Water Works Permit Number:** 013-206  
**Issue Date:** January 27, 2015

**Permit to Take Water Number:** 2030-8KDJCG  
**Issue Date:** August 3, 2011  
**Expiry Date:** March 31, 2016

**Operational Plan Number:** 013-406

**Financial Plan Number:** 013-301A

**MOECC Waterworks Number:** 220008658
Ballantrae-Musselman’s Lake Drinking Water System Performance

<table>
<thead>
<tr>
<th>2016 Treated Water Tests</th>
<th>Hardness</th>
<th>Sodium</th>
<th>Fluoride</th>
<th>Chlorine</th>
<th>E. coli</th>
<th>Total Coliforms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Results</td>
<td>174 mg/L</td>
<td>9 mg/L</td>
<td>0.08 mg/L</td>
<td>1.58 mg/L</td>
<td>Not Detected</td>
<td>Not Detected</td>
</tr>
</tbody>
</table>

Permitted and Actual Maximum Daily Withdrawal from the Ballantrae-Musselman’s Lake Production Wells for January 1 to December 31, 2016

<table>
<thead>
<tr>
<th>Location</th>
<th>Permitted Daily Withdrawal (litres)</th>
<th>Actual Maximum Daily Withdrawal (litres)</th>
<th>Days Operating at Peak Capacity (May to October)</th>
<th>Number of Days Operating at Peak Capacity (Annual)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well 1</td>
<td>2,617,920</td>
<td>1,562,758</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Well 2</td>
<td>2,617,920</td>
<td>1,818,406</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Well 3</td>
<td>2,617,920</td>
<td>2,046,750</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Wells 1 + 2 + 3</td>
<td>4,580,000</td>
<td>3,640,000</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Withdrawal from the Ballantrae-Musselman’s Lake Production Wells Jan. 1 to Dec. 31, 2016

Actual Annual Withdrawal
476,731,877 litres

Annual Permitted Withdrawal
1,671,700,000 litres

Percentage of Permitted Annual Withdrawal 29 per cent
Mount Albert is located within the Town of East Gwillimbury around Mount Albert Road between Highway 48 and York Durham Line. York Region manages the water supply of three wells and two elevated storage tanks. The Town of East Gwillimbury maintains and distributes the water to consumers from the Regional Supply.

**Raw Water Source Description**
Water taking is regulated by a Permit to Take Water issued by the Ministry of the Environment and Climate Change. Three wells extract groundwater from a deep aquifer. Iron, manganese and hardness levels are naturally elevated, which is common in deep aquifers across York Region. Staff use raw water test results to monitor the health of the aquifer and determine the best water treatment.

**Water Treatment and Supply**
Disinfection is maintained with chlorine. Water from Wells 1 and 2 are disinfected with sodium hypochlorite. Water from Well 3 is disinfected with chlorine gas. Sodium silicate is added to manage iron and manganese in the distribution system. The storage facilities hold water for peak demand use, and maintain pressure in the system.

In addition to routine water testing and facility inspections by Operators, online analyzers continuously monitor the treatment and delivery processes. These analyzers trigger alarms and automatically shut down and lockout pumps to notify Operators when immediate attention is needed on site.

---

**Summary of Approvals and Permits**

- **Municipal Drinking Water Licence Number**: 013-103
  - Issue Date: January 27, 2015
  - Expiry Date: January 26, 2020
- **Drinking Water Works Permit Number**: 013-203
  - 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
Mount Albert Drinking Water System Performance Summary

<table>
<thead>
<tr>
<th>2016 Treated Water Tests</th>
<th>Hardness</th>
<th>Sodium</th>
<th>Fluoride</th>
<th>Chlorine</th>
<th>E. coli</th>
<th>Total Coliforms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Results</td>
<td>302 mg/L</td>
<td>10 mg/L</td>
<td>0.06 mg/L</td>
<td>1.54 mg/L</td>
<td>Not Detected</td>
<td>Not Detected</td>
</tr>
</tbody>
</table>

Permitted and Actual Maximum Daily Withdrawal from the Mount Albert Production Wells for January 1 to December 31, 2016

<table>
<thead>
<tr>
<th>Location</th>
<th>Permitted Daily Withdrawal (litres)</th>
<th>Actual Maximum Daily Withdrawal (litres)</th>
<th>Days Operating at Peak Capacity (May to October)</th>
<th>Number of Days Operating at Peak Capacity (Annual)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well 1</td>
<td>3,273,120</td>
<td>2,308,563 October 29, 2016</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Well 2</td>
<td>3,273,120</td>
<td>1,898,836 October 6, 2016</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Well 3</td>
<td>3,273,120</td>
<td>1,522,875 July 4, 2016</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Wells 1 + 2 + 3</td>
<td>4,990,000</td>
<td>2,557,700 July 6, 2016</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Withdrawal from the Mount Albert Production Wells Jan. 1 to Dec. 31, 2016

Actual Annual Withdrawal 422,737,269 litres
Annual Permitted Withdrawal 1,821,350,000 litres
Percentage of Permitted Annual Withdrawal 23 per cent

System Monthly Average Flow (litres per day)
Nobleton is located within the Township of King around King Road and Highway 27. York Region manages the water supply of three wells, one booster pumping station and two elevated storage tanks. The Township of King maintains and distributes the water to consumers from the Regional Supply.

Raw Water Source Description
Water taking is regulated by a Permit to Take Water issued by the Ministry of the Environment and Climate Change. Three wells extract groundwater from a deep aquifer. Iron, manganese and hardness levels are naturally elevated, which is common in deep aquifers across York Region. Staff use raw water test results to monitor the health of the aquifer and determine the best water treatment.

Water Treatment and Supply
Disinfection is maintained with chlorine. Water from Wells 2 and 5 are disinfected with chlorine gas. Water from Well 3 is disinfected with sodium hypochlorite. Sodium silicate is added at all wells to manage iron and manganese in the distribution system. The storage facilities hold water for peak demand use and maintain pressure in the system. The booster pumping station also maintains pressure.

In addition to routine water testing and facility inspections by Operators, online analyzers continuously monitor the treatment and delivery processes. These analyzers trigger alarms and automatically shut down and lockout pumps to notify Operators when immediate attention is needed on site.

Summary of Approvals and Permits
Municipal Drinking Water Licence Number: 013-105  
Issue Date: July 3, 2015  
Expiry Date: January 26, 2020

Drinking Water Works Permit Number: 013-205  
Issue Date: July 3, 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
### Nobleton Drinking Water System Performance Summary

<table>
<thead>
<tr>
<th>2016 Treated Water Tests</th>
<th>Hardness</th>
<th>Sodium</th>
<th>Fluoride</th>
<th>Chlorine</th>
<th>E. coli</th>
<th>Total Coliforms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Results</td>
<td>254 mg/L</td>
<td>20 mg/L</td>
<td>0.13 mg/L</td>
<td>1.63 mg/L</td>
<td>Not Detected</td>
<td>Not Detected</td>
</tr>
</tbody>
</table>

### Permitted and Actual Maximum Daily Withdrawal from the Nobleton Production Wells for January 1 to December 31, 2016

<table>
<thead>
<tr>
<th>Location</th>
<th>Permitted Daily Withdrawal (litres)</th>
<th>Actual Maximum Daily Withdrawal (litres)</th>
<th>Days Operating at Peak Capacity (May to October)</th>
<th>Number of Days Operating at Peak Capacity (Annual)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well 2</td>
<td>1,964,000</td>
<td>1,553,875 November 8, 2016</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Well 3</td>
<td>2,496,000</td>
<td>2,326,375 August 30, 2016</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>Well 5</td>
<td>2,496,000</td>
<td>2,374,469 July 29, 2016</td>
<td>23</td>
<td>32</td>
</tr>
<tr>
<td>Wells 2 + 3 + 5</td>
<td>4,460,000</td>
<td>4,433,100 July 5, 2016</td>
<td>22</td>
<td>22</td>
</tr>
</tbody>
</table>

### Withdrawal from the Nobleton Production Wells Jan. 1 to Dec. 31, 2016

- Actual Annual Withdrawal: 665,402,219 litres
- Annual Permitted Withdrawal: 1,627,900,000 litres
- Percentage of Permitted Annual Withdrawal: 41 per cent
Schomberg is located within the Township of King around the intersections of Highway 27 and Highway 9, just south of the border with Simcoe County. York Region manages the water supply of three wells, one treatment plant and one elevated storage tank. The Township of King maintains and distributes water to consumers from the Regional Supply.

**Raw Water Source Description**
Water taking is regulated by a Permit to Take Water issued by the Ministry of the Environment and Climate Change. Three wells extract groundwater from a deep aquifer. Iron, manganese and hardness levels are naturally elevated, which is common in deep aquifers across York Region. Naturally occurring methane and ammonia are managed at the water treatment plant. Staff use raw water test results to monitor the health of the aquifer and determine the best water treatment.

**Water Treatment and Supply**
Water from the wells is pumped to an enhanced technology water treatment plant. Methane is stripped from the source water, and potassium permanganate removes iron and manganese before filtration. Filtration removes remaining odours and impurities. Water is disinfected with ultraviolet light and chlorine gas. Naturally occurring ammonia combines with the chlorine to form chloramine, which maintains disinfection in the distribution system. The storage facility holds water for peak demand use, and maintains pressure in the system.

In addition to routine water testing and facility inspections by Operators, online analyzers continuously monitor the treatment and delivery processes. These analyzers trigger alarms and automatically shut down and lockout pumps to notify Operators when immediate attention is needed on site.

**Summary of Approvals and Permits**

- **Municipal Drinking Water Licence Number**: 013-110
  - Issue Date: January 27, 2015
  - Expiry Date: January 26, 2020

- **Drinking Water Works Permit Number**: 013-210
  - 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
Schomberg Drinking Water System Performance Summary

<table>
<thead>
<tr>
<th>2016 Treated Water Tests</th>
<th>Hardness</th>
<th>Sodium</th>
<th>Fluoride</th>
<th>Chlorine</th>
<th>E. coli</th>
<th>Total Coliforms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Results</td>
<td>283 mg/L</td>
<td>19 mg/L</td>
<td>0.14 mg/L</td>
<td>2.47 mg/L</td>
<td>Not Detected</td>
<td>Not Detected</td>
</tr>
</tbody>
</table>

Permitted and Actual Maximum Daily Withdrawal from the Schomberg Production Wells for January 1 to December 31, 2016

<table>
<thead>
<tr>
<th>Location</th>
<th>Permitted Daily Withdrawal (litres)</th>
<th>Actual Maximum Daily Withdrawal (litres)</th>
<th>Days Operating at Peak Capacity (May to October)</th>
<th>Number of Days Operating at Peak Capacity (Annual)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well 2</td>
<td>1,636,560</td>
<td>23,629</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Well 3</td>
<td>2,290,000</td>
<td>1,865,000</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Well 4</td>
<td>1,507,680</td>
<td>1,296,000</td>
<td>35</td>
<td>45</td>
</tr>
</tbody>
</table>

Withdrawal from the Schomberg Production Wells Jan. 1 to Dec. 31, 2016

- Actual Annual Withdrawal: 547,304,983 litres
- Annual Permitted Withdrawal: 1,983,497,600 litres
- Percentage of Permitted Annual Withdrawal: 28 per cent

System Monthly Average Flow (litres per day)

- JANUARY: 1,424,789
- FEBRUARY: 1,461,957
- MARCH: 1,299,988
- APRIL: 1,380,662
- MAY: 1,627,926
- JUNE: 1,592,593
- JULY: 1,559,400
- AUGUST: 1,530,803
- SEPTEMBER: 1,628,233
- OCTOBER: 1,612,801
- NOVEMBER: 1,301,084
- DECEMBER: 1,519,487
The Town of Richmond Hill and the Cities of Vaughan and Markham form the southern border of York Region. These three municipalities receive all their water from Lake Ontario through the York Drinking Water System (York DWS). In these areas, initial treatment on the source water is done by Peel Region and the City of Toronto. In the communities north of Vaughan, Richmond Hill and Markham that receive water from the York DWS, the supply is supplemented with groundwater from wells.

There are seven subsystems connected to the York DWS that are supplemented with York Region groundwater. Each of these subsystems has its own summary in this report. The King City and Kleinburg subsystems have groundwater wells maintained for backup supply, however in 2016 they received all of their drinking water from the York DWS.

The York Drinking Water System consists of 8 pumping stations, 5 elevated storage tanks, and 7 underground storage reservoirs to maintain pressure and transmit this water from the suppliers to the local municipalities. The City of Vaughan, the Town of Richmond Hill and the City of Markham distribute the water to consumers from Regional Supply.

**Raw Water Source Description**
Lake Ontario water is treated by the City of Toronto or Peel Region and is supplied to York Region’s transmission system. No further treatment is applied to the southern York DWS.

In addition to routine water testing and facility inspections by Operators, online analyzers continuously monitor the treatment and delivery processes. These analyzers trigger alarms and automatically shut down and lockout pumps to notify Operators when immediate attention is needed on site.

**Toronto Water Supplied to York Region**
The Toronto/York Water Supply Agreement governs water supplied by the City of Toronto to York Region. The maximum volume allowed is 503,000,000 litres per day. In 2016, the average daily volume provided to York Region was 199,029,326 litres per day.

**Peel Water Supplied to York Region**
The York/Peel Water Supply Agreement governs water supplied by Peel Region to York Region. The maximum volume allowed is 179,430,000 litres per day. In 2016, the average daily volume provided to York Region was 101,791,490 litres per day.

**Accommodating Future Growth**
York Region receives volumes 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 2041.
York Drinking Water System Performance Summary

Individual subsystem summaries are found on pages 24 - 38

<table>
<thead>
<tr>
<th>2016 Treated Water Tests</th>
<th>Hardness</th>
<th>Sodium</th>
<th>Fluoride</th>
<th>Chlorine</th>
<th>E. coli</th>
<th>Total Coliforms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaughan Average Results</td>
<td>128 mg/L</td>
<td>21 mg/L</td>
<td>0.30 mg/L</td>
<td>1.03 mg/L</td>
<td>Not Detected</td>
<td>Not Detected</td>
</tr>
<tr>
<td>Richmond Hill Average Results</td>
<td>128 mg/L</td>
<td>21 mg/L</td>
<td>0.46 mg/L</td>
<td>1.36 mg/L</td>
<td>Not Detected</td>
<td>Not Detected</td>
</tr>
<tr>
<td>Markham Average Results</td>
<td>125 mg/L</td>
<td>15 mg/L</td>
<td>0.50 mg/L</td>
<td>1.35 mg/L</td>
<td>Not Detected</td>
<td>Not Detected</td>
</tr>
</tbody>
</table>

Water consumption supplied through agreements with the City of Toronto and Peel Region (litres per day)

<table>
<thead>
<tr>
<th></th>
<th>Supply from the City of Toronto</th>
<th>Supply from Peel Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Daily Consumption (litres per day)</td>
<td>199,029,326</td>
<td>101,791,490</td>
</tr>
<tr>
<td>Daily Permitted Consumption (litres per day)</td>
<td>503,000,000</td>
<td>179,430,000</td>
</tr>
</tbody>
</table>

Total Permitted Consumption (Toronto and Peel Combined) = 682,430,000 litres per day

2016 York DWS Monthly Average Consumption of Purchased Lake Ontario Water

Peak Demand Period is May to October
The Town of Aurora is located in the centre of York Region, bound by Bathurst Street, Bloomington Road, Highway 404 and just north of St. John’s Sideroad. York Region manages the water supply of six wells, two elevated storage tanks, three underground storage reservoirs, and three booster pumping stations. Lake Ontario water is also supplied from the south by the York Drinking Water System (York DWS). The Town of Aurora maintains and distributes the water to consumers from the Regional Supply.

The Aurora Drinking Water System is part of an interconnecting system between Aurora, Holland Landing, Queensville, Newmarket and the larger York DWS. Connection to the York DWS reduces demand on the aquifer and provides a secure secondary source of drinking water.

**Raw Water Source Description**
Groundwater taking is regulated by a Permit to Take Water issued by the Ministry of the Environment and Climate Change. The City of Toronto and Peel Region have permits for taking Lake Ontario water. Supply agreements govern the purchase of water from the City of Toronto and Peel Region. Six wells extract groundwater from a deep aquifer. Iron, manganese and hardness levels are naturally elevated, which is common in deep aquifers across York Region. Staff use raw water test results to monitor the health of the aquifer and determine the best water treatment.

**Water Treatment and Supply**
Disinfection is maintained with chlorine and ammonia (chloramine). Sodium silicate is added to manage iron and manganese in the distribution system. The storage facilities hold water for peak demand use, and maintain pressure in the system. Three booster pumping stations also maintain pressure.

In addition to routine water testing and facility inspections by Operators, online analyzers continuously monitor the treatment and delivery processes. These analyzers trigger alarms and automatically shut down and lockout pumps to notify Operators when immediate attention is needed on site.

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**Summary of Approvals and Permits**

**Municipal Drinking Water Licence Number:** 013-101  
**Issue Date:** October 26, 2016  
**Expiry Date:** January 26, 2020

**Drinking Water Works Permit Number:** 013-201  
**Issue Date:** June 11, 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:** 220002440
### 2016 Treated Water Tests

<table>
<thead>
<tr>
<th></th>
<th>Hardness</th>
<th>Sodium</th>
<th>Fluoride</th>
<th>Chlorine</th>
<th>E. coli</th>
<th>Total Coliforms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Results</td>
<td>133 mg/L</td>
<td>22 mg/L</td>
<td>0.46 mg/L</td>
<td>2.33 mg/L</td>
<td>Not Detected</td>
<td>Not Detected</td>
</tr>
</tbody>
</table>

### Permitted and Actual Maximum Daily Withdrawal from the Aurora Production Wells for January 1 to December 31, 2015

<table>
<thead>
<tr>
<th>Location</th>
<th>Permitted Daily Withdrawal (litres)</th>
<th>Actual Maximum Daily Withdrawal (litres)</th>
<th>Days Operating at Peak Capacity (May to October)</th>
<th>Number of Days Operating at Peak Capacity (Annual)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well 1</td>
<td>3,273,120</td>
<td>3,145,000 June 30, 2016</td>
<td>41</td>
<td>50</td>
</tr>
<tr>
<td>Well 2</td>
<td>5,891,760</td>
<td>5,183,000 June 26, 2016</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Well 3</td>
<td>5,237,136</td>
<td>4,765,000 June 26, 2016</td>
<td>21</td>
<td>21</td>
</tr>
<tr>
<td>Well 4</td>
<td>7,855,632</td>
<td>5,595,000 June 30, 2016</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Well 5</td>
<td>5,891,760</td>
<td>3,433,000 February 2, 2016</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Well 6</td>
<td>3,469,536</td>
<td>1,753,500 April 6, 2016</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

### Withdrawal from the Aurora Production Wells Jan. 1 to Dec. 31, 2016

- Actual Annual Withdrawal: 2,842,309,000 litres
- Annual Permitted Withdrawal: 11,540,914,560 litres
- Percentage of Permitted Annual Withdrawal: 25 per cent

### System Monthly Average Flow (litres per day)

- January: 9,798,065
- February: 7,850,483
- March: 6,399,387
- April: 7,040,933
- May: 7,287,952
- June: 8,618,417
- July: 8,741,839
- August: 8,179,500
- September: 8,195,900
- October: 6,944,258
- November: 7,303,900
- December: 6,836,435
Holland Landing is a village in the Town of East Gwillimbury, located in the northern part of York Region. It sits roughly between Yonge Street, Highway 11, Mount Albert Road and Queensville Sideroad. York Region manages the water supply of two wells, two elevated storage tanks and one booster pumping station. Lake Ontario water is also supplied from the south by the York Drinking Water System (York DWS). The Town of East Gwillimbury maintains and distributes the water to consumers from the Regional Supply.

The Holland Landing Drinking Water System is part of an interconnecting system between Aurora, Holland Landing, Queensville, Newmarket and the larger York DWS. Connection to the York DWS reduces demand on the aquifer and provides a secure secondary source of drinking water.

**Raw Water Source Description**

Groundwater taking is regulated by a Permit to Take Water issued by the Ministry of the Environment and Climate Change. The City of Toronto and Peel Region have permits for taking Lake Ontario water. Supply agreements govern the purchase of water from the City of Toronto and Peel Region. Two wells extract groundwater from a deep aquifer. Iron, manganese and hardness levels are naturally elevated, which is common in deep aquifers across York Region. Staff use raw water test results to monitor the health of the aquifer and determine the best water treatment.

**Water Treatment and Supply**

Disinfection is maintained with chlorine gas and ammonia (chloramine). Sodium silicate is added to manage iron and manganese in the distribution system. The storage facilities hold water for peak demand use, and maintain pressure in the system. The booster pumping station also maintains pressure.

In addition to routine water testing and facility inspections by Operators, online analyzers continuously monitor the treatment and delivery processes. These analyzers trigger alarms and automatically shut down and lockout pumps to notify Operators when immediate attention is needed on site.
Holland Landing Drinking Water System Performance Summary

<table>
<thead>
<tr>
<th>2016 Treated Water Tests</th>
<th>Hardness</th>
<th>Sodium</th>
<th>Fluoride</th>
<th>Chlorine</th>
<th>E. coli</th>
<th>Total Coliforms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Results</td>
<td>168 mg/L</td>
<td>22 mg/L</td>
<td>0.19 mg/L</td>
<td>2.11 mg/L</td>
<td>Not Detected</td>
<td>Not Detected</td>
</tr>
</tbody>
</table>

Permitted and Actual Maximum Daily Withdrawal from the Holland Landing Production Wells for January 1 to December 31, 2016

<table>
<thead>
<tr>
<th>Location</th>
<th>Permitted Daily Withdrawal (litres)</th>
<th>Actual Maximum Daily Withdrawal (litres)</th>
<th>Days Operating at Peak Capacity (May to October)</th>
<th>Number of Days Operating at Peak Capacity (Annual)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well 1</td>
<td>2,291,184</td>
<td>1,859,500 January 24, 2016</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Well 2</td>
<td>3,600,432</td>
<td>2,985,250 January 24, 2016</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

Withdrawal from the Holland Landing Production Wells Jan. 1 to Dec. 31, 2016

- Actual Annual Withdrawal 406,164,375 litres
- Annual Permitted Withdrawal 2,150,439,840 litres
- Percentage of Permitted Annual Withdrawal 19 per cent

System Monthly Average Flow (litres per day)

- January 1,074,500
- February 983,405
- March 810,169
- April 1,110,442
- May 1,245,855
- June 2,102,500
- July 1,610,502
- August 1,241,169
- September 903,017
- October 762,089
- November 702,163
- December 775,335
King City is a community centred on King Road and Keele Street, in the south-east corner of the Township of King. In 2016, the community of King City received all of its water from Lake Ontario through the York Drinking Water System (York DWS). York Region maintains two groundwater wells in King City as backup water supply. York Region stores water in King City with two elevated storage tanks. The Township of King maintains and distributes the water to consumers from the Regional Supply.

The King City Drinking Water System is part of an interconnecting system between Aurora, Holland Landing, Queensville, Newmarket and the larger York DWS. The York DWS is the primary source of drinking water in King City, and the aquifer would provide a secondary source of drinking water if needed.

**Raw Water Source Description**

Groundwater taking is regulated by a Permit to Take Water issued by the Ministry of the Environment and Climate Change. The City of Toronto and Peel Region have permits for taking Lake Ontario water. Supply agreements govern the purchase of water from the City of Toronto and Peel Region. Two wells extract groundwater from a deep aquifer. Iron, manganese and hardness levels are naturally elevated, which is common in deep aquifers across York Region. Staff use raw water test results to monitor the health of the aquifer and determine the best water treatment.

**Water Treatment and Supply**

Disinfection is maintained with chloramine prior to entry to the York DWS. Sodium silicate manages iron and manganese in the distribution system. The groundwater system is upgraded to provide chloramine disinfection in case the wells are needed in an emergency. The storage facilities hold water for peak demand use, and maintain pressure in the system.

In addition to routine water testing and facility inspections by Operators, online analyzers continuously monitor the treatment and delivery processes. These analyzers trigger alarms and automatically shut down and lockout pumps to notify Operators when immediate attention is needed on site.

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**Summary of Approvals and Permits**

**Municipal Drinking Water Licence Number:** 013-101  
Issue Date: October 26, 2016  
Expiry Date: January 26, 2020

**Drinking Water Works Permit Number:** 013-201  
Issue Date: June 11, 2015  
Expiry Date: June 11, 2025

**Permit to Take Water Number:** 1407-9MRQYL  
Issue Date: September 5, 2014  
Expiry Date: December 31, 2024

**Operational Plan Number:** 013-401

**Financial Plan Number:** 013-301A

**MOECC Waterworks Number:** 220002299
### King City Drinking Water System Performance Summary

<table>
<thead>
<tr>
<th>2016 Treated Water Tests</th>
<th>Hardness</th>
<th>Sodium</th>
<th>Fluoride</th>
<th>Chlorine</th>
<th>E. coli</th>
<th>Total Coliforms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Results</td>
<td>131 mg/L</td>
<td>25 mg/L</td>
<td>0.51 mg/L</td>
<td>1.86 mg/L</td>
<td>Not Detected</td>
<td>Not Detected</td>
</tr>
</tbody>
</table>

### Permitted and Actual Maximum Daily Withdrawal from the King City Production Wells for January 1 to December 31, 2016

<table>
<thead>
<tr>
<th>Location</th>
<th>Permitted Daily Withdrawal (litres)</th>
<th>Actual Maximum Daily Withdrawal (litres)</th>
<th>Days Operating at Peak Capacity (May to October)</th>
<th>Number of Days Operating at Peak Capacity (Annual)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well 3</td>
<td>1,963,915</td>
<td>24,900</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Well 4</td>
<td>2,618,554</td>
<td>51,938</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

### Withdrawal from the King City Production Wells Jan. 1 to Dec. 31, 2016

- Actual Annual Withdrawal: 1,497,625 litres
- Annual Permitted Withdrawal: 1,672,601,185 litres
- Percentage of Permitted Annual Withdrawal: 0 per cent

Note: in 2016, water from King City wells was used for testing, not for supply
Kleinburg is a village in the City of Vaughan. In 2016, the village of Kleinburg received all of its water from Lake Ontario through the York Drinking Water System (York DWS). York Region maintains two groundwater wells in Kleinburg as backup water supply. York Region stores water in the village of Kleinburg with one elevated storage tank and boosts pressure with two pumping stations. The City of Vaughan maintains and distributes the water to consumers from the Regional Supply.

The Kleinburg Drinking Water System is part of the larger York DWS. The York DWS is the primary source of drinking water in Kleinburg, and the aquifer would provide a secondary source of drinking water if needed.

**Raw Water Source Description**
Groundwater taking is regulated by a Permit to Take Water issued by the Ministry of the Environment and Climate Change. The City of Toronto and Peel Region have permits for taking Lake Ontario water. Supply agreements govern the purchase of water from the City of Toronto and Peel Region. Two wells extract groundwater from a deep aquifer. Iron, manganese and hardness levels are naturally elevated, which is common in deep aquifers across York Region. Staff use raw water test results to monitor the health of the aquifer and determine the best water treatment.

**Water Treatment and Supply**
Disinfection is maintained with chloramine prior to entry to the York DWS. Sodium silicate manages iron and manganese in the distribution system. The groundwater system is being upgraded to provide chloramine disinfection in case the wells are needed in an emergency. The storage facilities hold water for peak demand use, and maintain pressure in the system.

In addition to routine water testing and facility inspections by Operators, online analyzers continuously monitor the treatment and delivery processes. These analyzers trigger alarms and automatically shut down and lockout pumps to notify Operators when immediate attention is needed on site.

**Summary of Approvals and Permits**
- **Municipal Drinking Water Licence Number:** 013-101
  - Issue Date: October 26, 2016
  - Expiry Date: January 26, 2020
- **Drinking Water Works Permit Number:** 013-201
  - Issue Date: June 11, 2015
- **Permit to Take Water Number:** 2485-9W8KUW
  - Issue Date: May 29, 2015
  - Expiry Date: May 31, 2020
- **Operational Plan Number:** 013-401
- **Financial Plan Number:** 013-301A
- **MOECC Waterworks Number:** 220002360
Kleinburg Drinking Water System Performance Summary

<table>
<thead>
<tr>
<th>2016 Treated Water Tests</th>
<th>Hardness</th>
<th>Sodium</th>
<th>Fluoride</th>
<th>Chlorine</th>
<th>E. coli</th>
<th>Total Coliforms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Results</td>
<td>131 mg/L</td>
<td>25 mg/L</td>
<td>0.48 mg/L</td>
<td>1.71 mg/L</td>
<td>Not Detected</td>
<td>1 Occurrence</td>
</tr>
</tbody>
</table>

Permitted and Actual Maximum Daily Withdrawal from the Kleinburg Production Wells for January 1 to December 31, 2016

<table>
<thead>
<tr>
<th>Location</th>
<th>Permitted Daily Withdrawal (litres)</th>
<th>Actual Maximum Daily Withdrawal (litres)</th>
<th>Days Operating at Peak Capacity (May to October)</th>
<th>Number of Days Operating at Peak Capacity (Annual)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wells 3 &amp; 4</td>
<td>5,237,000</td>
<td>695,216 October 5, 2016</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Withdrawal from the Kleinburg Production Wells Jan. 1 to Dec. 31, 2016

- Actual Annual Withdrawal: 4,560,978 litres
- Annual Permitted Withdrawal: 1,911,505,000 litres
- Percentage of Permitted Annual Withdrawal: 0 per cent

Note: in 2016, water from Kleinburg wells was used for testing system upgrades
Newmarket is a town located centrally in York Region. York Region manages the water supply of six wells, four elevated storage tanks, two underground storage reservoirs, and two booster pumping stations. Lake Ontario water is also supplied by the York Drinking Water System (York DWS). Newmarket wells were taken offline in April 2016 for a system optimization project, with water supplied by the York, Aurora and Queensville Drinking Water Systems. The Town of Newmarket maintains and distributes the water to consumers.

The Newmarket Drinking Water System is part of the larger York DWS. Connection to the York DWS reduces demand on the aquifer and provides a secure secondary source of drinking water.

**Raw Water Source Description**
Groundwater taking is regulated by a Permit to Take Water issued by the Ministry of the Environment and Climate Change. The City of Toronto and Peel Region have permits for taking Lake Ontario water. Supply agreements govern the purchase of water from the City of Toronto and Peel Region. Wells extract groundwater from deep and shallow aquifers. Iron, manganese and hardness levels are naturally elevated, which is common in deep aquifers across York Region. Staff use raw water test results to monitor the health of the aquifer and determine the best water treatment.

**Water Treatment and Supply**
Disinfection is maintained with chlorine and ammonia (chloramine). Chlorine gas is used at most wells, except Well 14 which uses sodium hypochlorite. Sodium silicate is added to manage iron and manganese in the distribution system. The storage facilities hold water for peak demand use, and maintain pressure in the system. Disinfection is boosted at some storage facilities. Two booster pumping stations also maintain pressure.

In addition to routine water testing and facility inspections by Operators, online analyzers continuously monitor the treatment and delivery processes. These analyzers trigger alarms and automatically shut down and lockout pumps to notify Operators when immediate attention is needed on site.

**Summary of Approvals and Permits**
- **Municipal Drinking Water Licence Number**: 013-101
  - Issue Date: October 26, 2016
  - Expiry Date: January 26, 2020
- **Drinking Water Works Permit Number**: 013-201
  - Issue Date: June 11, 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
Newmarket Drinking Water System Performance Summary

<table>
<thead>
<tr>
<th>2016 Treated Water Tests</th>
<th>Hardness</th>
<th>Sodium</th>
<th>Fluoride</th>
<th>Chlorine</th>
<th>E. coli</th>
<th>Total Coliforms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Results</td>
<td>155 mg/L</td>
<td>21 mg/L</td>
<td>0.35 mg/L</td>
<td>2.21 mg/L</td>
<td>Not Detected</td>
<td>3 Occurrences</td>
</tr>
</tbody>
</table>

Permitted and Actual Maximum Daily Withdrawal from the Newmarket Production Wells for January 1 to December 31, 2016

<table>
<thead>
<tr>
<th>Location</th>
<th>Permitted Daily Withdrawal (litres)</th>
<th>Actual Maximum Daily Withdrawal (litres)</th>
<th>Days Operating at Peak Capacity (May to October)</th>
<th>Number of Days Operating at Peak Capacity (Annual)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well 1</td>
<td>2,291,184</td>
<td>1,178,750 March 6, 2016</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Well 2</td>
<td>4,582,512</td>
<td>2,527,000 February 7, 2016</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Well 13</td>
<td>5,891,760</td>
<td>3,205,500 February 13, 2016</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Well 14</td>
<td>2,291,184</td>
<td>Offline</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Well 15</td>
<td>3,273,120</td>
<td>1,626,500 March 6, 2016</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Well 16</td>
<td>5,629,824</td>
<td>3,405,125 March 6, 2016</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Withdrawal from the Newmarket Production Wells Jan. 1 to Dec. 31, 2016

- Actual Annual Withdrawal: 532,587,328 litres
- Annual Permitted Withdrawal: 8,745,248,160 litres
- Percentage of Permitted Annual Withdrawal: 6 per cent

Note: in April 2016, Newmarket wells were taken offline and operated only for the optimization project.
Queensville and Sharon are villages in the Town of East Gwillimbury. York Region manages the water supply of four wells and one elevated storage tank. Lake Ontario water is also supplied from the south by the York Drinking Water System (York DWS). Much of the water produced in Queensville and Sharon is distributed to Holland Landing and to Newmarket through the York DWS. The Town of East Gwillimbury maintains and distributes the water to consumers from the Regional Supply.

The Sharon/Queensville Drinking Water Sub-System is part of an interconnecting system between Aurora, Holland Landing, Queensville, Newmarket and the larger York DWS. Connection to the York DWS reduces demand on the aquifers and provides a secure secondary source of drinking water.

**Raw Water Source Description**
Groundwater taking is regulated by a Permit to Take Water issued by the Ministry of the Environment and Climate Change. The City of Toronto and Peel Region have permits for taking Lake Ontario water. Supply agreements govern the purchase of water from the City of Toronto and Peel Region. Four wells extract groundwater from a deep aquifer. Iron, manganese and hardness levels are naturally elevated, which is common in deep aquifers across York Region. Staff use raw water test results to monitor the health of the aquifer and determine the best water treatment.

**Water Treatment and Supply**
Disinfection is maintained with chlorine gas and ammonia (chloramine). Sodium silicate is added to manage iron and manganese in the distribution system. The storage facility holds water for peak demand use and maintains pressure in the system.

In addition to routine water testing and facility inspections by Operators, online analyzers continuously monitor the treatment and delivery processes. These analyzers trigger alarms and automatically shut down and lockout pumps to notify Operators when immediate attention is needed on site.

**Summary of Approvals and Permits**
- **Municipal Drinking Water Licence Number:** 013-101
  - Issue Date: October 26, 2016
  - Expiry Date: January 26, 2020
- **Drinking Water Works Permit Number:** 013-201
  - Issue Date: June 11, 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:** 220001955
### 2016 Treated Water Tests

<table>
<thead>
<tr>
<th></th>
<th>Hardness</th>
<th>Sodium</th>
<th>Fluoride</th>
<th>Chlorine</th>
<th>E. coli</th>
<th>Total Coliforms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Results</td>
<td>168 mg/L</td>
<td>18 mg/L</td>
<td>0.18 mg/L</td>
<td>2.30 mg/L</td>
<td>Not Detected</td>
<td>Not Detected</td>
</tr>
</tbody>
</table>

---

### Permitted and Actual Maximum Daily Withdrawal from the Sharon/Queensville Production Wells for January 1 to December 31, 2016

<table>
<thead>
<tr>
<th>Location</th>
<th>Permitted Daily Withdrawal (litres)</th>
<th>Actual Maximum Daily Withdrawal (litres)</th>
<th>Days Operating at Peak Capacity (May to October)</th>
<th>Number of Days Operating at Peak Capacity (Annual)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well 1</td>
<td>6,546,384</td>
<td>5,296,000 August 13, 2016</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Well 2</td>
<td>6,546,384</td>
<td>4,195,000 June 24, 2016</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Well 3</td>
<td>6,546,384</td>
<td>4,244,000 June 24, 2016</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Well 4</td>
<td>6,546,384</td>
<td>5,970,000 November 24, 2016</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

---

### Withdrawal from the Sharon/Queensville Production Wells Jan. 1 to Dec. 31, 2016

- Actual Annual Withdrawal: 1,853,321,500 litres
- Annual Permitted Withdrawal: 9,557,720,640 litres
- Percentage of Permitted Annual Withdrawal: 19 per cent

### System Monthly Average Flow (litres per day)

- January: 5,594,935
- February: 5,608,483
- March: 5,460,516
- April: 4,784,600
- May: 5,062,194
- June: 6,056,433
- July: 5,109,355
- August: 4,822,548
- September: 4,121,817
- October: 4,285,984
- November: 4,869,750
- December: 5,009,548
Stouffville Drinking Water System

York Drinking Water Sub-System: Groundwater, Surface Water – Lake Ontario Blended Supply

Stouffville is a community located in the Town of Whitchurch-Stouffville. York Region manages the water supply of five wells, two elevated storage tanks, one underground reservoir and three booster pumping stations. Lake Ontario water is also supplied by the York Drinking Water System (York DWS). The Town of Whitchurch-Stouffville maintains and distributes the water to consumers from the Regional Supply.

Connection to the York DWS reduces demand on the aquifers and provides a secure secondary source of drinking water.

Raw Water Source Description
Groundwater taking is regulated by a Permit to Take Water issued by the Ministry of the Environment and Climate Change. The City of Toronto and Peel Region have permits for taking Lake Ontario water. Supply agreements govern the purchase of water from the City of Toronto and Peel Region. Wells 1 and 2 extract groundwater from a deep aquifer. Wells 3, 5 and 6 extract water from a shallow aquifer. Elevated chloride, sulphate and sodium concentrations are found in the shallow aquifer. Iron, manganese and hardness levels are naturally elevated in the deep aquifer.

Water Treatment and Supply
Water is disinfected with chlorine. Water from the York DWS is treated to convert chloramine to free chlorine. Wells 1 and 2 are treated with sodium hypochlorite. Wells 3, 5 and 6 are treated with chlorine gas. Wells 5 and 6 are first treated with ultraviolet light because they are classified as Groundwater Under Direct Influence of surface water (GUDI). Sodium silicate is added to manage iron and manganese in the distribution system. Storage facilities hold water and maintain pressure in the system. The three booster pumping stations also maintain pressure and control disinfection.

In addition to routine water testing and facility inspections by Operators, online analyzers continuously monitor the treatment and delivery processes. These analyzers trigger alarms and automatically shut down and lockout pumps to notify Operators when immediate attention is needed on site.

Summary of Approvals and Permits

Municipal Drinking Water Licence Number: 013-101
Issue Date: October 26, 2016
Expiry Date: January 26, 2020

Drinking Water Works Permit Number: 013-201
Issue Date: June 11, 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
## Stouffville Drinking Water System Performance Summary

### 2016 Treated Water Tests

<table>
<thead>
<tr>
<th></th>
<th>Hardness</th>
<th>Sodium</th>
<th>Fluoride</th>
<th>Chlorine</th>
<th>E. coli</th>
<th>Total Coliforms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Results</td>
<td>331 mg/L</td>
<td>35 mg/L</td>
<td>0.11 mg/L</td>
<td>1.48 mg/L</td>
<td>Not Detected</td>
<td></td>
</tr>
</tbody>
</table>

### Permitted and Actual Maximum Daily Withdrawal from the Stouffville Production Wells for January 1 to December 31, 2016

<table>
<thead>
<tr>
<th>Location</th>
<th>Permitted Daily Withdrawal (litres)</th>
<th>Actual Maximum Daily Withdrawal (litres)</th>
<th>Days Operating at Peak Capacity (May to October)</th>
<th>Number of Days Operating at Peak Capacity (Annual)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well 1</td>
<td>2,946,240</td>
<td>2,831,131 July 18, 2016</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Well 2</td>
<td>2,946,240</td>
<td>2,817,348 June 26, 2016</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Well 3</td>
<td>2,946,240</td>
<td>2,924,945 July 27, 2016</td>
<td>38</td>
<td>38</td>
</tr>
<tr>
<td>Well 5</td>
<td>3,110,400</td>
<td>2,878,050 June 26, 2016</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Well 6</td>
<td>2,289,600</td>
<td>1,722,680 August 14, 2016</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

### Withdrawal from the Stouffville Production Wells Jan. 1 to Dec. 31, 2016

- **Actual Annual Withdrawal**: 1,293,175,576 litres
- **Annual Permitted Withdrawal**: 5,197,132,800 litres
- **Percentage of Permitted Annual Withdrawal**: 25 per cent

### System Monthly Average Flow (litres per day)

- **January**: 3,290,165
- **February**: 3,144,214
- **March**: 3,142,283
- **April**: 3,068,702
- **May**: 2,581,398
- **June**: 5,288,864
- **July**: 6,410,413
- **August**: 4,998,738
- **September**: 3,508,223
- **October**: 1,805,985
- **November**: 2,403,944
- **December**: 2,735,579
The communities of Keswick and Sutton, and other lakeshore communities, are located on the south shore of Lake Simcoe at the northern end of York Region. York Region manages the water supply of the Georgina Water Treatment Plant (WTP) and one storage facility. The Town of Georgina maintains and distributes the water to consumers from the Regional Supply.

**Raw Water Source Description**

Water taking is regulated by a Permit to Take Water issued by the Ministry of the Environment and Climate Change. A one metre diameter intake pipe on Lake Simcoe draws water from 1.5 kilometres offshore at a depth of 19 metres. A pumping station transfers water to the treatment plant. Local animal and plant populations occasionally contribute to poor source water quality. Lake Simcoe also contains algae, which can add a musty taste or odour to the water supply. Mussel growth on the intake pipe is controlled to prevent obstruction of water flow. Staff use raw water test results to monitor the health of the lake and determine the best water treatment.

**Water Treatment and Supply**

Georgina WTP treatment process:
- Screening for large objects at the intake pipe
- Diffused chlorine injection at the intake pipe to control mussel growth
- Membrane filtration to remove suspended solids and potentially harmful organisms
- Granular activated carbon (GAC) improves taste and odour
- Disinfection by using ultraviolet light, followed by chlorine

The storage facility holds water for peak demand use, and maintains pressure in the system. Fluoride is applied at the level recommended by the Province.

In addition to routine water testing and facility inspections by Operators, online analyzers continuously monitor the treatment and delivery processes. These analyzers trigger alarms and automatically shut down and lockout pumps to notify Operators when immediate attention is needed on site.

**Summary of Approvals and Permits**

- **Municipal Drinking Water Licence Number**: 013-104
  - Issue Date: January 27, 2015
  - Expiry Date: January 26, 2020
- **Drinking Water Works Permit Number**: 013-204
  - 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
# Georgina Drinking Water System Performance Summary

## 2016 Treated Water Tests

<table>
<thead>
<tr>
<th></th>
<th>Hardness</th>
<th>Sodium</th>
<th>Fluoride</th>
<th>Chlorine</th>
<th>E. coli</th>
<th>Total Coliforms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Results</td>
<td>140 mg/L</td>
<td>28 mg/L</td>
<td>0.51 mg/L</td>
<td>1.76 mg/L</td>
<td>Not Detected</td>
<td>Not Detected</td>
</tr>
</tbody>
</table>

---

## Permitted and Actual Maximum Daily Withdrawal from the Georgina Water Treatment Plant for January 1 to December 31, 2016

<table>
<thead>
<tr>
<th>Location</th>
<th>Permitted Daily Withdrawal (litres)</th>
<th>Actual Maximum Daily Withdrawal (litres)</th>
<th>Days Operating at Peak Capacity (May to October)</th>
<th>Number of Days Operating at Peak Capacity (Annual)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Treatment Plant</td>
<td>50,000,000</td>
<td>18,617,000</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

---

## Withdrawal from the Georgina Water Treatment Plant

- **Jan. 1 to Dec. 31, 2016**
  - Actual Annual Withdrawal: 3,257,458,000 litres
  - Annual Permitted Withdrawal: 10,950,000,000 litres
  - Percentage of Permitted Annual Withdrawal: 30 per cent

---

## System Monthly Average Flow (litres per day)

- **January**: 8,963,452
- **February**: 9,160,448
- **March**: 8,648,710
- **April**: 9,249,167
- **May**: 10,685,774
- **June**: 12,592,300
- **July**: 11,585,387
- **August**: 10,291,032
- **September**: 7,879,500
- **October**: 6,131,065
- **November**: 5,760,633
- **December**: 5,867,387
The community of Keswick is located on the east shore of Cook’s Bay at the northern end of York Region. Upgrades to this facility were completed in 2016. When it was offline, the community of Georgina/Keswick was supplied by the Georgina Water Treatment Plant. York Region manages the water supply of the Keswick Water Treatment Plant (WTP) and three dual-purpose storage and rechlorination facilities. The Town of Georgina maintains and distributes the water to consumers from the Regional Supply.

**Raw Water Source Description**

Water taking is regulated by a Permit to Take Water issued by the Ministry of the Environment and Climate Change. A 0.6 metre diameter intake pipe on Cook’s Bay draws water from 365 metres offshore at a depth of 8.5 metres. Local animal and plant populations occasionally contribute to poor source water quality. Lake Simcoe and Cook’s Bay also contain algae, which can give a musty taste or odour to the water supply. Mussel growth on the intake pipe is controlled to prevent obstruction of water flow. Staff use raw water test results to plan water treatment.

**Water Treatment and Supply**

Keswick WTP treatment process:
- Screening for large objects at the intake pipe
- Diffused chlorine injection at the intake pipe to control mussel growth
- Membrane filtration to remove suspended solids and potentially harmful organisms
- Granular activated carbon (GAC) improves taste and odour
- Disinfection by using ultraviolet light, followed by chlorine

The storage facilities hold water for peak demand use, and maintain pressure in the system. Fluoride is applied at the level recommended by the Province.

In addition to routine water testing and facility inspections by Operators, online analyzers continuously monitor the treatment and delivery processes. These analyzers trigger alarms and automatically shut down and lockout pumps to notify Operators when immediate attention is needed on site.

**Summary of Approvals and Permits**

- **Municipal Drinking Water Licence Number**: 013-104
  - Issue Date: January 27, 2015
  - Expiry Date: January 26, 2020
- **Drinking Water Works Permit Number**: 013-204
  - 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
### Keswick Drinking Water System Performance Summary

<table>
<thead>
<tr>
<th>2016 Treated Water Tests</th>
<th>Hardness</th>
<th>Sodium</th>
<th>Fluoride</th>
<th>Chlorine</th>
<th>E. coli</th>
<th>Total Coliforms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Results</td>
<td>141 mg/L</td>
<td>28 mg/L</td>
<td>0.51 mg/L</td>
<td>1.43 mg/L</td>
<td>Not Detected</td>
<td>Not Detected</td>
</tr>
</tbody>
</table>

### Permitted and Actual Maximum Daily Withdrawal from the Keswick Water Treatment Plant for January 1 to December 31, 2016

<table>
<thead>
<tr>
<th>Location</th>
<th>Permitted Daily Withdrawal (litres)</th>
<th>Actual Maximum Daily Withdrawal (litres)</th>
<th>Days Operating at Peak Capacity (May to October)</th>
<th>Number of Days Operating at Peak Capacity (Annual)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Treatment Plant</td>
<td>18,150,000</td>
<td>6,288,000 October 29, 2016</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

### Withdrawal from the Keswick Water Treatment Plant Jan. 1 to Dec. 31, 2016

- Actual Annual Withdrawal: 418,009,810 litres
- Annual Permitted Withdrawal: 5,927,600,000 litres
- Percentage of Permitted Annual Withdrawal: 7 per cent

**Note:** the Keswick WTP was brought back online after facility upgrades in August 2016.
Glossary of Terms

Adverse Water Quality Event – The process of reporting and correcting a water quality measurement or observation that does not meet regulated standards for prescribed laboratory analyzed or field monitored parameters.

Aquifer – an underground layer of porous rock, gravel or soil that is filled with water and can be used as a source of groundwater.

Chloramine - chlorine and ammonia combined in water forms chloramine, which is used for secondary disinfection as a long lasting disinfectant.

Chloride – a chlorine based salt that is tested on a regular basis to assess groundwater conditions. It is found naturally in some rocks and soils, and it also originates from runoff.

Chlorine – disinfectant used to kill pathogens in drinking water. Chlorine gas and sodium hypochlorite are both used for chlorine disinfection.

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

Distribution System - water supply network consisting of pipes, watermains, valves, pumping stations and water storage facilities that deliver water to consumers. The Region’s distribution system carries water from wells or treatment plants to the local municipality distribution system through large transmission mains.


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

E. coli - bacteria found in fecal matter that may be washed into water by rain, snowmelt and other forms of precipitation. It is an indicator of the possible presence of disease causing bacteria.

Enhanced Treatment – includes a variety of treatment methods for controlling odours or impurities in the source water.

Filtration – a process to physically remove particles or impurities from the source water. It can be accomplished through microporous membranes or granular activated carbon.

Fluoride - added to drinking water to help prevent tooth decay. Fluoride can also naturally occur in groundwater. Where fluoride is added to drinking water, it is adjusted to the 0.5 - 0.8 mg/L, the level recommended by the Province.

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

Groundwater – water that collects below the Earth’s surface when precipitation filters through soil and rocks. The upper surface of groundwater is called the water table.

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. Ultraviolet light is used for primary disinfection of GUDI water sources.

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 are considered optimal. Water supplies with hardness greater than 200 mg/L are considered poor but tolerable.

Iron - often present in groundwater form nearby mineral deposits. It may also be present in surface waters from sediment at the bottom of the water body. Iron is controlled in most distribution systems with sodium silicate.
Glossary of Terms - continued

**Manganese** – a metal that is often found in groundwater due to natural mineral deposits. Manganese is controlled in most distribution systems with sodium silicate.

**Milligrams 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 regulating and licensing the water and wastewater industry in Ontario.

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

**Municipal Drinking Water Licence (MDWL)** – a licence for municipal residential drinking water systems, requiring the 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.

**Ontario Drinking Water Quality Standards (ODWQS)** - Ontario Regulation 169/03 under the Safe Drinking Water Act, 2002. The ODWQS lists the maximum allowable concentrations for many bacteriological, organic and inorganic parameters.

**Permit To Take Water** – a permit issued by the Ministry of the Environment and Climate Change to regulate the quantity and timing of water taking.

**Potassium Permanganate (K MnO 4)** - used to treat drinking water for iron, manganese and sulfur odours.

**Raw Water** – untreated surface water or groundwater.

**Sodium** - found naturally in surface and groundwater across southern Ontario. Sodium can also enter groundwater from runoff. Sodium can make the water taste salty at 200mg/L, which is the aesthetic objective. The local Medical Officer of Health is notified when sodium concentration exceeds 20 mg/L in the drinking water system.

**Sodium Hypochlorite** – a type of chlorine used for disinfection in drinking water.

**Sodium Silicate** - used to manage iron in drinking water and reduce the potential for iron stains on plumbing fixtures and laundry.

**Sulphate** – a sulphur based salt that occurs naturally in many soil and rock formations.

**Surface Water** – water that is found at the Earth’s surface in lakes, streams or other bodies of water.

**Total Coliform (TC)** - coliform group of bacteria is used to screen for fecal contamination, determine treatment effectiveness and verify distribution system integrity. Total coliforms are free-living in the environment, but are also present in water contaminated with human and animal feces. They usually do not cause disease.

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

**Turbidity** - measures suspended particles or impurities that make water cloudy. More total suspended solids make the water more turbid.

**Ultraviolet Disinfection (UV)** - form of water disinfection. Ultraviolet light emits radiation to disrupt the DNA of any waterborne diseases that pass by. This form of disinfection does not stay in the water – it only acts at the point of application.
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.
DRINKING WATER
SYSTEMS REPORT 2016

The Regional Municipality of York
Environmental Services Department
1-877-464-9675
york.ca

Accessible formats or communications supports are available upon request.