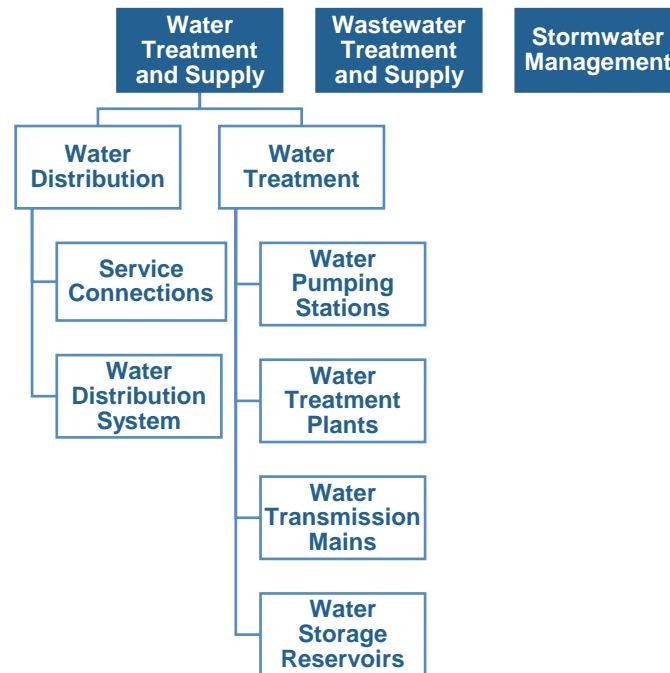




# WATER SERVICES

## PROGRAM MAP



Toronto Water manages Toronto's water treatment & supply; from the point source water is pumped from Lake Ontario, to the point that drinking water is delivered to residential, and ICI (industrial, commercial, and institutional) customers. It also includes the provision of water through fire hydrants for fire protection. The two main activities are:

- Treatment of over 1 billion litres of source water from Lake Ontario each day at four water treatment plants to ensure the quality of drinking water meets or exceeds regulatory requirements;
- Distribution of drinking water via almost 511,450 connections to industrial, commercial, institutional and household water users/ customers. In Toronto this is accomplished with 18 water pumping stations, 550 kilometres of trunk watermains, 11 major underground storage reservoirs, four elevated storage tanks, 64,900 valves, and 5,551 kilometres of distribution watermains. If these watermains were laid end-to-end, they would exceed the entire distance from Newfoundland to British Columbia.

Funding for these activities is provided through municipal water rates.

## SUMMARY OF PERFORMANCE MEASUREMENT RESULTS

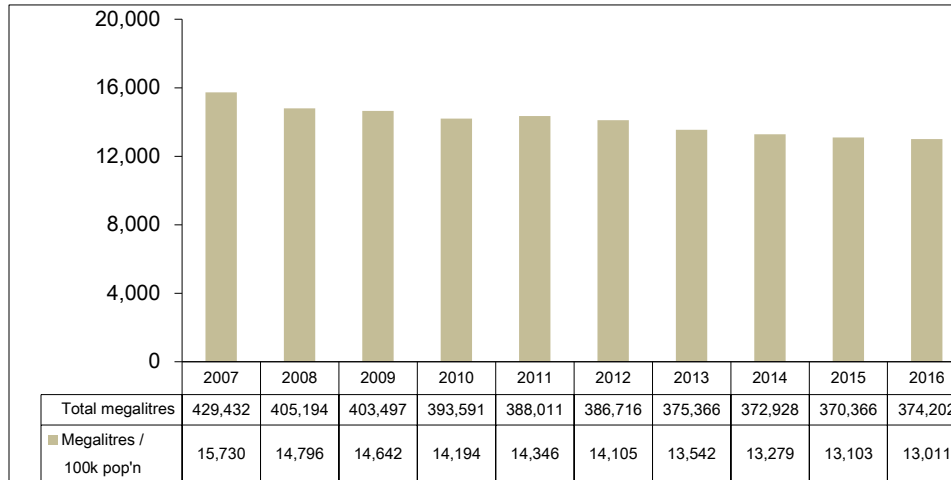
Question	Indicator/Measure	Internal Comparison of Toronto's 2016 vs. 2015 Results	External Comparison to Other Municipalities (MBNC) By Quartile for 2016	Chart & Page Ref.
<b>Service/Activity Level Indicators</b>				
How much drinking water is treated each year?	Megalitres of Water Treated per 100,000 Population – (activity Level)	<b>Decrease</b>  Volume of water treated decreased (activity level indicator)	<b>2</b>  Rate/volume of water treated was higher compared to others (activity level indicator)	36.1 36.2  pg. 5
How old are the water distribution pipes?	Average Age of Water Pipe - (Service Level)	<b>Stable</b> Average age of water pipe is relatively stable at 59.5 years (no graph)	<b>4</b> Older average age of pipes compared to others (service level indicator)	36.8  pg. 10
<b>Community Impact Measures</b>				
How much drinking water does the average household use?	Residential Water Use (Megalitres) per Household – (Community Impact)	<b>Decrease</b>  Amount of water used per household slightly decreased	<b>2</b>  Lower rate of water usage per household compared to others	36.3 36.4  pg. 7
<b>Customer Service/Quality Measures</b>				
Is the quality of drinking water in compliance with provincial standards?	% of Water Quality Tests in Compliance with Provincial Drinking Water Standards - (Customer Service/Quality)	<b>Stable</b>  Percentage of tests in compliance has remained stable in 2016	<b>4</b>  Lower rate than other municipalities but still very high at 99.38%	36.5 36.6  pg. 8/9
Were there any boil water advisories?	Number of Household Days with Boil Water Advisories – (Customer Service/Quality)	<b>Favourable</b>  Zero boil water advisories	<b>1</b>  Zero boil water advisories	pg. 9
How many watermain breaks are there?	Number of Water Main Breaks per 100 KM of Water Distribution Pipe – (Customer Service)	<b>Decrease</b>  Number of water main breaks decreased	<b>4</b>  Higher rate of water main breaks compared to others	36.7 36.8  pg. 9/10

Question	Indicator/Measure	Internal Comparison of Toronto's 2016 vs. 2015 Results	External Comparison to Other Municipalities (MBNC) By Quartile for 2016	Chart & Page Ref.	
Efficiency Measures					
What does it cost in to distribute drinking water?	Operating Cost for the Distribution of Drinking Water per km of Water Distribution Pipe – (Efficiency)	Stable  Operating cost of water distribution was stable	4  Higher operating cost of water distribution compared to others	36.9 36.10	
What does it cost in to distribute drinking water?	Total Cost for the Distribution of Drinking Water per km of Water Distribution Pipe – (Efficiency)	Increase  Total cost of water distribution increased	4  Higher total cost of water distribution compared to others	pg. 11/12	
What does it cost to treat drinking water?	Operating Cost for the Treatment of Drinking Water per Megalitre of Drinking Water Treated – (Efficiency)	Increase  Operating cost of water treatment increased	1  Lower operating cost of water treatment compared to others	36.11 36.12	
What does it cost to treat drinking water?	Total Cost for the Treatment of Drinking Water per Megalitre of Drinking Water Treated – (Efficiency)	Increase  Total cost of water treatment increased	1  Lower total cost of water treatment compared to others	pg. 13	
Overall Results		Service/ Activity Level Indicators (Resources)  0 - Increased 1 - Stable 0 - decreased  100% stable or increased	Performance Measures (Results)  3 - Favorable 2 - Stable 3 - Unfavorable  63% favorable or stable	Service Level Indicators (Resources)  0 - 1st quartile 1 - 2nd quartile 0 - 3rd quartile 1 - 4th quartile  50% in 1st and 2nd quartiles	Performance Measures (Results)  3 - 1st quartile 1 - 2nd quartile 0 - 3rd quartile 4 - 4th quartile  50% in 1st and 2nd quartiles

For an explanation of how to interpret this summary and the supporting charts, please see the Guide to Toronto's Performance Results. These quartile results are based on a maximum sample size of 15 municipalities.

## SERVICE/ACTIVITY LEVELS

### 36.1 - HOW MUCH DRINKING WATER IS TREATED EACH YEAR IN TORONTO?

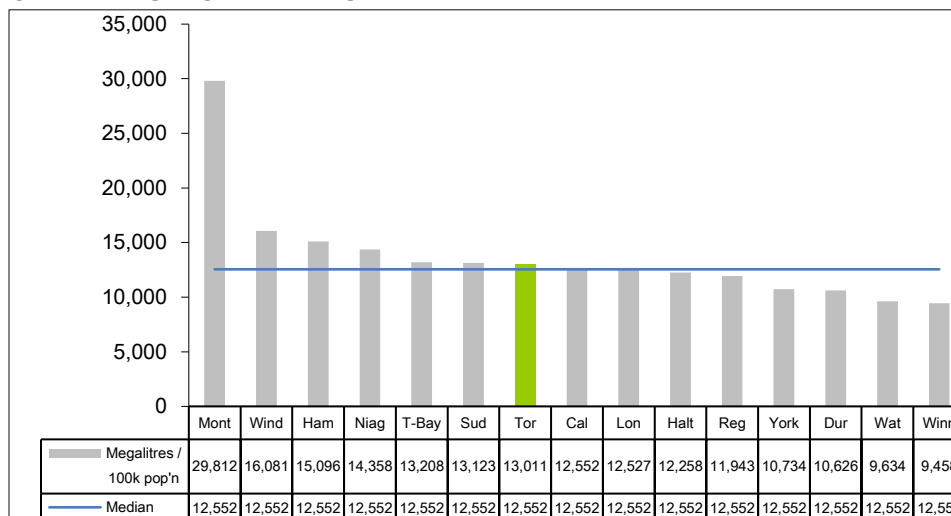


**Chart 36.1** summarizes Toronto's total volume (megalitres) and rate of drinking water treated per 100,000 population. One megalitre is equivalent to one million litres.

**Chart 36.1 (City of Toronto) Megalitres of Drinking Water Treated per 100,000 Population**

In 2016, there was a 0.7 percent decline in the annual volume of drinking water treated per 100,000 population, consistent with the longer-term trend of consumers using less water.

### 36.2 - HOW DOES THE AMOUNT OF WATER TREATED IN TORONTO, COMPARE TO OTHER MUNICIPALITIES?



**Chart 36.2** compares Toronto's 2016 result to the volume of water treated per 100,000 population to other municipalities.

**Chart 36.2 (MBNC 2016) Megalitres of Drinking Water Treated per 100,000 Population**

These are total volumes that include amounts used by both the residential and ICI (industrial, commercial and institutional) sectors. Toronto ranks seventh of fifteen (second quartile) in terms of having the highest volumes of water treated, 3.7% higher than the median of benchmarked cities and regions. In many municipalities, the ICI sectors can use significant volumes of water

in their operations. In Toronto in the ICI sector accounted for 37 percent of the total volumes of drinking water treated in 2016.

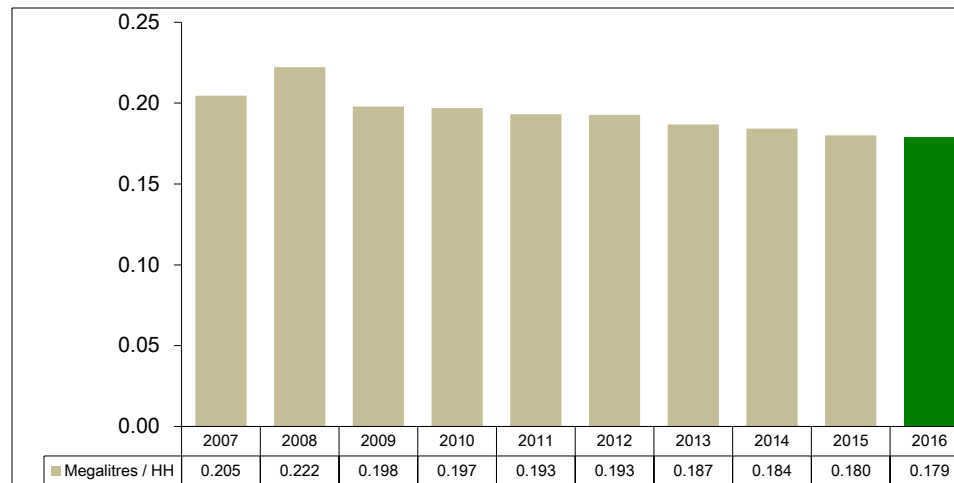
Contributors to gradually annually reducing water consumption include:

- Annually growing number of high density condominiums in which water use is lower than in homes;
- Improved water conservation resulting from City initiatives;
- More efficient water consumption products;
- Impact of higher water rates,
- Some wetter summers, resulting in less outdoor water use for irrigation;
- A high level of public education and environmental awareness; and
- A reduction in some large industrial water users.

## COMMUNITY IMPACT

Toronto has an approved water efficiency plan designed to protect the environment and accommodate future population growth within the planned capacity of water treatment plants.

### 36.3 – HOW MUCH DRINKING WATER DOES THE AVERAGE TORONTO HOUSEHOLD USE?

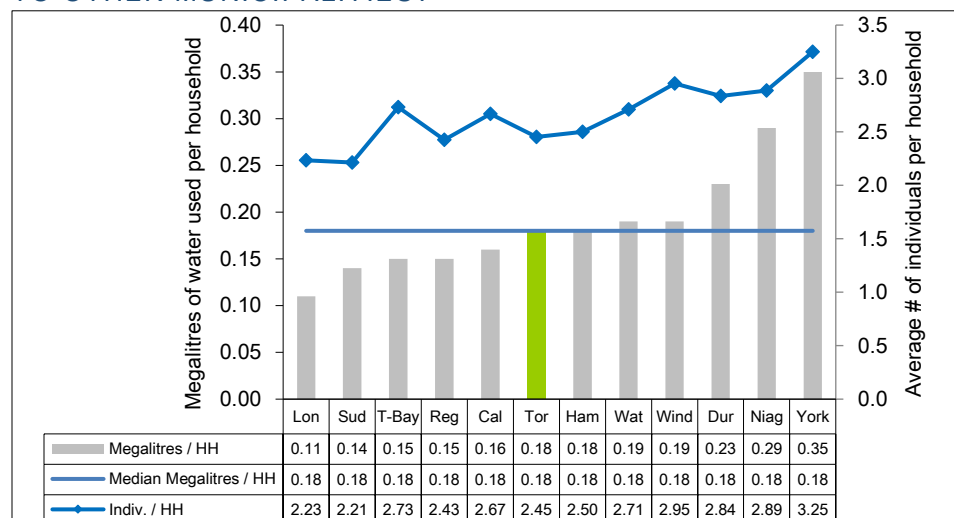


**Chart 36.3** shows the annual volume of water (in megalitres) used in an average Toronto household.

**Chart 36.3 (City of Toronto) Megalitres of Drinking Water Used per Household**

In 2016, the rate of mega liters per household decreased marginally. The results for 2010 and prior years are not based on the revised population estimates.

### 36.4 – HOW DOES TORONTO'S DRINKING WATER USE PER HOUSEHOLD COMPARE TO OTHER MUNICIPALITIES?



**Chart 36.4** compares Toronto's 2016 water use per household to other municipalities, plotted as bars relative to the left axis.

**Chart 36.4 (MBNC 2016) Annual Residential Water Use (Megalitres) per Household (Community Impact) & Average Number of Individuals per Household**

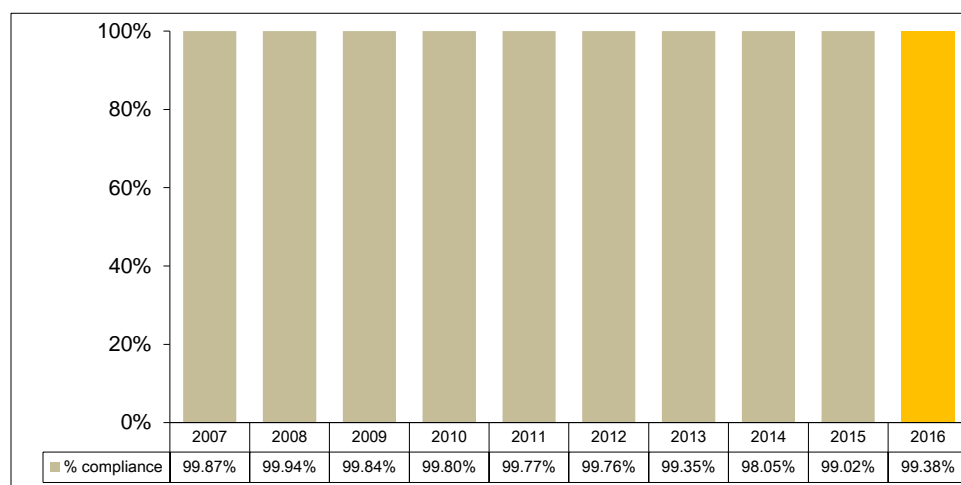
Toronto ranks sixth of twelve (second quartile) in terms of having the lowest water use per household. The average number of individuals per household is also plotted as a line graph relative to the right axis, since family size can impact household water consumption. Natural change out of inefficient toilets and washing machines with more water efficient models contribute to declining residential water consumption. Rebates and lower water rates are also used as incentives to lower water consumption among industrial, commercial and institutional customers.

Annual household water usage can be impacted by the amount of rain and resulting outdoor water use requirements for activities such as the watering of lawns and gardens. Examining total daily water use during the winter months (when outdoor water use is minimal) is one way of examining longer term trends.

## CUSTOMER SERVICE

The quality of drinking water provided in Toronto is of paramount importance. Toronto's drinking water monitoring program extends in intensity and scope well beyond provincial regulatory requirements. Toronto regularly tests for many more parameters than required by the province.

### 36.5—HOW DOES TORONTO'S WATER QUALITY MEET OR EXCEED PROVINCIAL STANDARDS?



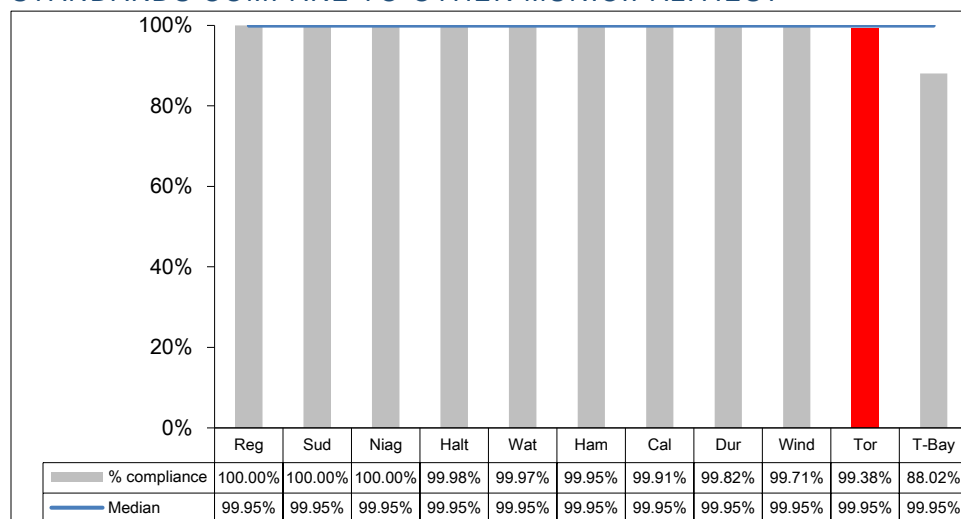
**Chart 36.5** reflects Toronto's results for the number of drinking water microbiological test results that met or exceeded the standards as set out in Ontario Regulation 169/03 of the Ontario Drinking Water Act. Results continued to be very strong in 2016 at 99.38%.

**Chart 36.5 (City of Toronto) % of Water Quality Tests in Compliance with Drinking Water Standards**

During 2016, 25,414 analyses were performed on treated water, as well as at various stages of treatment. Additional tests are conducted through comprehensive distribution monitoring. There was a 20% increase in number of tests from 2007 to 2016.



### 36.6 –HOW DOES TORONTO'S COMPLIANCE WITH PROVINCIAL WATER QUALITY STANDARDS COMPARE TO OTHER MUNICIPALITIES?



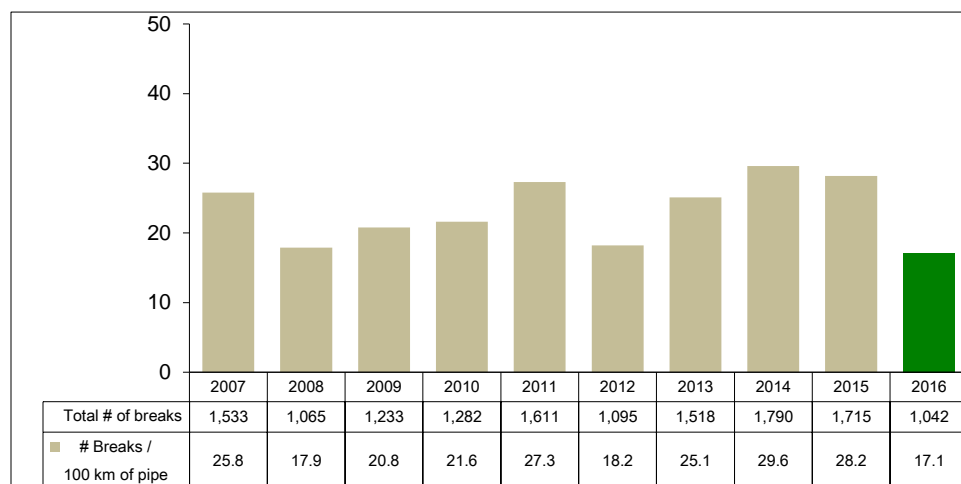
**Chart 36.6** compares Toronto's 2016 result to other municipalities for the percentage of tests in compliance with provincial standards.

**Chart 36.6 (MBNC 2016) % of Water Quality Tests in Compliance with Drinking Water Standards**

In terms of having the highest compliance rate, Toronto's result ranks tenth of eleven municipalities (fourth quartile); however, Toronto continues to have very high rates of compliance at 99.38 percent.

Another measure of water quality is the weighted number of days when a boil water advisory relating to a municipal water supply is issued by the Medical Officer of Health. In Toronto, there were no boil water advisories issued in 2016 or prior years.

### 36.7 –HOW MANY WATERMAIN BREAKS OCCUR IN TORONTO?



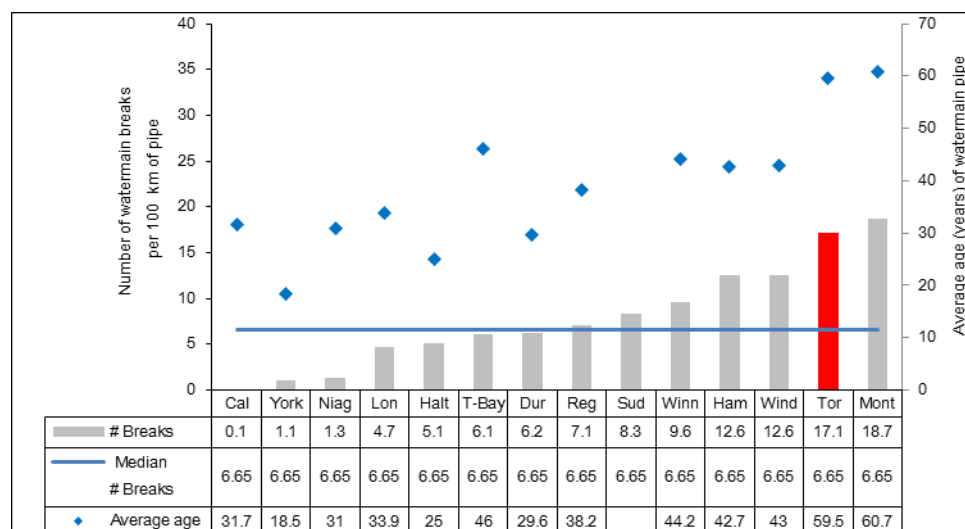
**Chart 36.7** summarizes Toronto's total number and rate of watermain breaks per 100 km of pipe, and shows a decrease in 2016. The rate of breaks varies from year to year.

**Chart 36.7 (City of Toronto) Annual Number of Watermain Breaks per 100 km of Distribution Pipe**

Temperature fluctuations in winter can have a significant effect on the rate of breaks, especially considering the age of Toronto's infrastructure. Other contributing factors that can lead to

variations in watermain break rates are nearby construction projects and changes in water pressure due to other project work. In 2015, there were severe temperature fluctuations in the winter of 2015, which resulted in more water main breaks in an aging distribution pipe system. In 2016, temperature changes were more moderate and had less impact to watermain breaks.

### 36.8 HOW DOES TORONTO'S RATE OF WATERMAIN BREAKS COMPARE TO OTHER MUNICIPALITIES?



**Chart 36.8** shows Toronto's 2016 ratio of watermain breaks compared to other municipalities, plotted as bars relative to the left axis.

**Chart 36.8 (MBNC 2016) Annual Number of Watermain Breaks per 100 km of Distribution Pipe and Average Age of Watermains**

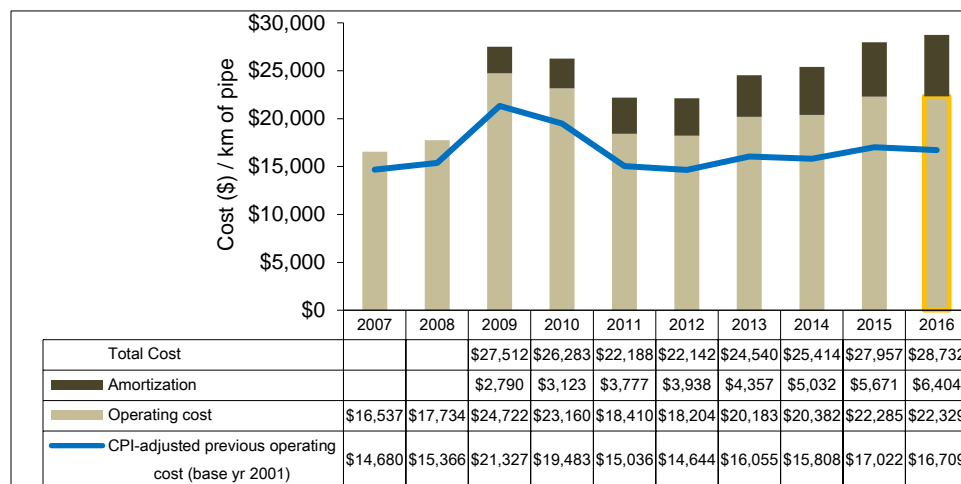
Toronto ranks thirteenth of fourteen (fourth quartile), with the highest rate of watermain breaks. The condition and age of a municipality's water distribution system can be significant factors in the number of watermain breaks. The average age of the water distribution pipe is plotted on Chart 36.8 relative to the right axis. Toronto's watermain system is the second oldest of the MBNC municipalities at an average of 59.5 years, with 24 percent of the watermains over 80 years old. The condition of the watermain system can be affected by the amount of co-located utilities and subway and streetcar tracks, which can accelerate pipe corrosion (through electrolysis) and is another factor contributing to Toronto's higher rate of breaks.

## EFFICIENCY

Water distribution refers to the process of distributing drinking water from the water treatment plant through the system of watermains to the customer.

Water treatment costs include the operation and maintenance of treatment plants as well as quality assurance and laboratory testing to ensure compliance with regulations.

### 36.9 – WHAT DOES IT COST IN TORONTO TO DISTRIBUTE DRINKING WATER?

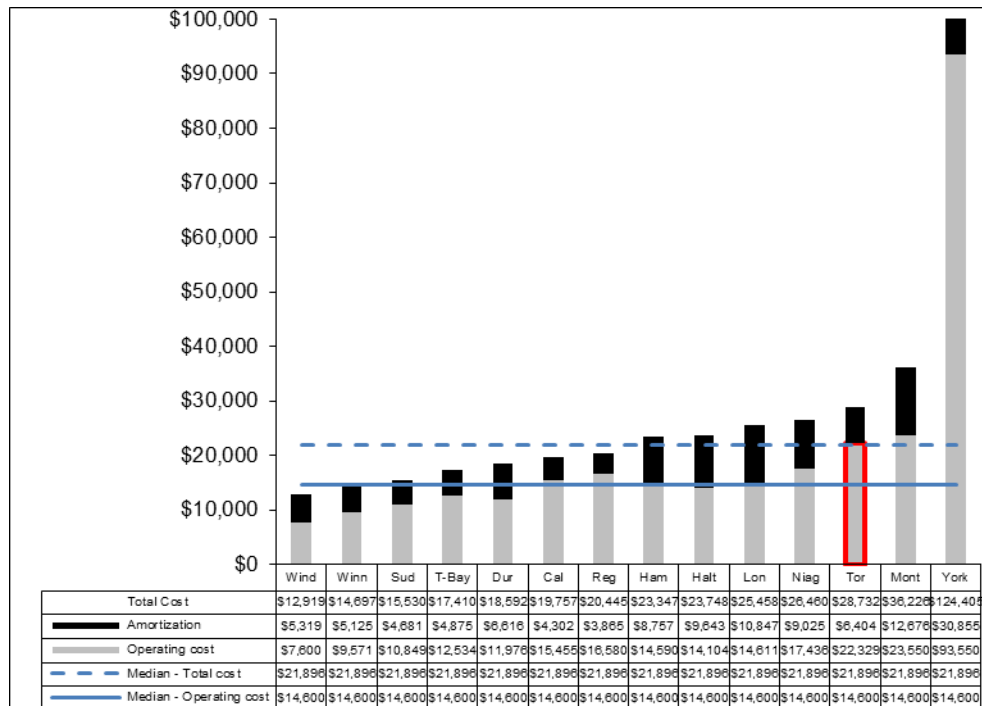


**Chart 36.9** provides Toronto's operating cost and total cost (operating plus amortization) of water distribution, per kilometre of distribution pipe.

**Chart 36.9 (City of Toronto) Operating and Total Cost for Drinking Water Distribution per Km of Pipe**

It also provides Consumer Price Index (CPI) adjusted operating results. This adjusts the actual result for each year by the change in Toronto's CPI since the base year of 2001. Operating cost trends correlate closely with the CPI. Starting in 2009, changes in accounting policies were instituted; therefore, results of 2009 and subsequent years are not as comparable to 2008 and prior years. There has been a longer term trend of increasing capital costs in response to aging infrastructure. In 2016, there was an increase in total costs per km of pipe by 2.8% and the operating costs per km of pipe remained relatively stable.

### 36.10 – HOW DOES THE COST OF DISTRIBUTING DRINKING WATER IN TORONTO COMPARE TO OTHER MUNICIPALITIES?

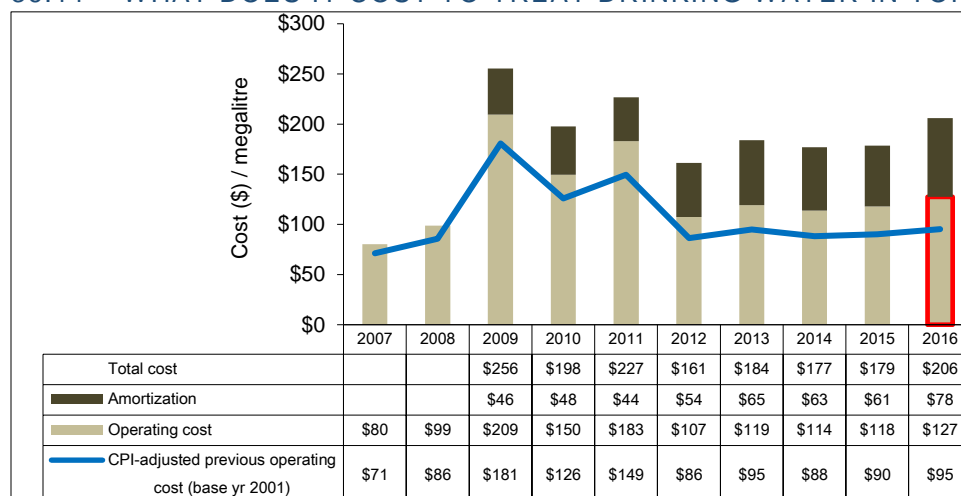


**Chart 36.10** compares Toronto's 2016 cost of water distribution per km of pipe to other municipalities.

**Chart 36.10 (MBNC 2016) Operating and Total Cost for Drinking Water Distribution per Km of Pipe**

Toronto ranks twelfth of fourteen (fourth quartile) for operating costs and for total costs in terms of having the lowest cost. The topography of the City of Toronto is a factor in our high costs. Because the city slopes upward from Lake Ontario, it is necessary to have 12 separate pressure districts at six different levels to provide adequate pressure to all consumers. In some cases, water must be pumped three or four times before it reaches the consumer, requiring additional energy and money. In 2016 335 kWhr/ML were consumed by the water treatment facilities, about the same as the electrical energy amount consumed since 2013. Toronto's high operating costs are also related to the comparatively high rate of watermain breaks and the age of its infrastructure.

### 36.11 – WHAT DOES IT COST TO TREAT DRINKING WATER IN TORONTO?

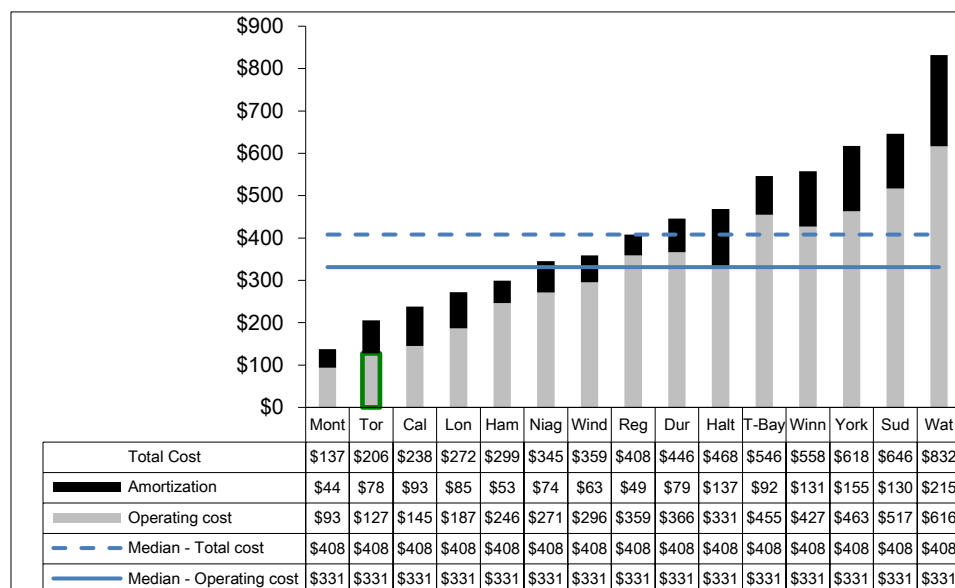


**Chart 36.11** summarizes Toronto's operating cost and total cost (operating plus amortization) of water treatment per megalitre (one million litres) of drinking water.

**Chart 36.11 (City of Toronto) Operating and Total Cost for Drinking Water Treatment per Megalitre**

Starting in 2009, changes in accounting policies were instituted; therefore, results of 2009 and subsequent years are not as comparable to 2008 and prior years. Toronto's 2016 operating costs and total costs both increased. Total cost increased by 15.3% and operating cost increased by 8%.

### 36.12 – HOW DOES TORONTO'S COST TO TREAT DRINKING WATER COMPARE TO OTHER MUNICIPALITIES?



**Chart 36.12** compares Toronto's 2016 cost of water treatment per megalitre to other municipalities.

Toronto ranks second of fifteen municipalities (first quartile) for both operating costs and total costs in terms of the lowest cost. The primary factors behind Toronto's lower costs are

efficiencies and economies of scale realized from the operation and modernization of four large water treatment plants, and an accessible source water lake rather than ground water sources.

## 2016 ACHIEVEMENTS AND 2017 PLANNED INITIATIVES

The following initiatives have improved or are expected to further improve the efficiency and effectiveness of Fire Services in Toronto:

### 2016 Accomplishments & Achievements

- Transmission Operations Optimizer (TOO) project completed reducing the total cost of electrical consumption by optimizing the operations of the pumping of treated water -- received a Toronto Hydro incentive cheque of \$1.6 million.
- Water Meter Program, which began in 2010, in final year of implementation. By the end of 2016, approximately 470,500 or 99% of all customers have been upgraded to the new automated system. Expected annual operating savings is approximately \$5 million and new annual revenue of \$27million.
- Toronto Water's laboratory successfully underwent a full external assessment by the Canadian Association for Laboratory Accreditation acquiring full accreditation for another two years.
- As of September 1, 2016, received and processing 3,018 Basement Flooding Protection Program applications to provide financial subsidy to install flood protection devices such as backwater valves.
- Ongoing education and outreach program attending 173 outreach events with an estimated attendance of 8.3 million people as reported by event organizers.
- Continued implementation of the water conservation projects related to the Industrial Water Rate Program resulted in estimated water savings of 3.75 million m3 per year.
- The Dental Sector has a greater than 80% compliance rate for managing dental fillings as required by the new Sewers Bylaw Amendments introduced in February 2016.
- Repaired approximately 975 watermain breaks and 760 water service lines/curb stops.

### 2017 Planned Initiatives

The 2017 Operating Budget will enable Toronto Water to:

- Ensure delivery of water and wastewater services for 3.6 million residents and business in Toronto.
- Provide treatment and supply of 433 billion litres of water (includes York Region).
- Continue collection and treatment of 400 billion litres of wastewater.
- Continue maintenance and repair of 6,100 km of watermains, 4,100 km of sanitary sewers, 5,000 km of storm sewers, and 1,400 km of combined sewers.
- Replace 5,000 sub-standard water services.
- Repair 1,600 broken watermains.
- Provide Environmental Monitoring and Protection including on-going public consultations and awareness programs.

## **Factors Influencing the Results of Municipalities**

The results of each municipality included in this report can be influenced to varying degrees by factors such as:

- Demand: variation in demand from ICI and residential sectors, relative to total system demand.
- Supply: cost is impacted by the water source (ground water or surface water), treatment costs and the size of the geographic area and water supply/distribution systems serviced.
- Treatment plants: number, size and complexity of a municipality's water treatment plants.
- Urban density: proximity of pipes to other utilities affects the cost for infrastructure repair and replacement.
- Age of infrastructure: age and condition of the water distribution pipe, type of water distribution pipe material and frequency of maintenance activities.
- Local water supply requirements: specific municipal water quality requirements may exceed provincial regulations.
- Weather conditions: negative impacts from severe and frequent extreme weather events.
- Conservation programs: extent of municipal water conservation programs can impact water consumption.
- Government Structure: Single-tier service providers with jurisdiction over the water system vs. two-tier system where the responsibility for water service is divided between the local municipalities and the Regional municipality.