St. Catharines

2024

Annual Summary Report

Water Distribution System

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CITY OF ST. CATHARINES

WATER DISTRIBUTION SYSTEM
2024 ANNUAL SUMMARY REPORT

March 2025

Waterworks #260003279

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Definitions

Backflow – the unwanted reversal of flow potentially introducing contaminations into the potable water supply.

Chlorine Residual - the amount of chlorine available for disinfection.

Escherichia coli (E. coli) – a sub-group of Coliform bacteria, often associated with fecal pollution.

Lead – present as a result of corrosion of lead solder, lead containing brass fittings or lead water service pipes.

Total Coliforms – the group of bacteria most commonly used as an indicator of water quality.

Disinfection By-Products - Trihalomethanes (THMs), Haloacetic Acids (HAAs) – Chemicals formed when chlorine reacts with organic matter in water.

Purpose

Water is essential for daily life, supporting households, businesses, industries, and municipal services such as fire protection and recreational activities. The Safe Drinking Water Act (SDWA) mandates that municipal councils receive an annual report detailing compliance with regulatory requirements, any operational failures, and corrective actions taken.

The SDWA mandates includes the following municipal responsibilities:

1. Recognize that the people of Ontario are entitled to expect their drinking water to be safe; and,
2. Provide for the protection of human health and the prevention of drinking water health hazards through the control and regulation of drinking water systems and drinking water testing.

Unless otherwise noted, this report covers the period from January 1, 2024, to December 31, 2024.

Waterworks Description

The St. Catharines water distribution system is classified as a Class II, large residential system by the Ministry of Environment, Conservation and Parks (MECP). The distribution system obtains potable water from the Niagara Region's DeCew Water Treatment Plant, which draws surface water from Lake Erie via the Welland Canal. The City's water system is generally located within the urban boundary and is subdivided into three pressure zones. The City's waterworks consists of:

- 605 kilometres of watermains.
- Approximately 3,500 hydrants.
- Over 5,500 valves.

The Decew Water Treatment Plant is a conventional surface water treatment plant which utilizes a multi-step treatment process, including screening, flocculation, sedimentation, filtration, and disinfection (using sodium hypochlorite and ultraviolet light).

Municipal Drinking Water Licensing Program

Municipalities must be licensed to operate their drinking water systems, with licenses renewed every five years. The City's last renewal was in September 2024.

There are four components to the license that are applicable to St. Catharines:

1. Drinking Water Works Permit - Allows for the establishment and alteration of the system, such as replacing and installing new watermains.

2. The Drinking Water Quality Management System (DWQMS) – A systematic approach ensuring safe water supply.

3. System Accreditation –The City undergoes annual audits and a three-year external verification audit.

4. Financial Plan – Ensures long-term financial sustainability, required for license renewal.

The Drinking Water Quality Management System Policy

The City of St. Catharines is committed to:

- Ensuring a consistent supply of safe, high-quality drinking water.
- Maintaining and continuously improving its Quality Management System; and
- Meeting or surpassing applicable legislation and regulations.

Actions Taken to Comply with the Safe Drinking Water Act

The Ontario *Safe Drinking Water Act* provides for the protection of human health and the prevention of drinking water health hazards through the control and regulation of drinking water systems and drinking water testing services. Ontario has a multi-barrier drinking water safety net, a framework designed to protect drinking water from the source to the tap. To meet regulatory requirements the City:

- Conducts monthly microbiological and chlorine residual testing.

- Performs quarterly sampling for disinfection by-products (THMs and HAAs).

- Uses Ontario Water Wastewater Certification Office (OWWCO) certified Water Quality Analysts and Water Distribution Operators. These certifications must be renewed every three years and have mandatory, MECP-approved training requirements.

- Uses accredited laboratories, which are audited by the Canadian Association for Laboratories Accreditation (CALA) and accredited by the Standards Council of Canada (SCC).

- Ensures all sample results are available to the public. Annual reports are available at City Hall and on the City's website, www.stcatharines.ca.

- Reports any exceedances to the MECP, Regional Public Health Department, and the Decew Water Treatment Plant.

- Undergoes an annual MECP compliance inspection.

- Maintain full DWQMS accreditation, including annual audits conducted by the third-party accreditation body - NSF International Strategic Registrations.

Water Quality Test Results

Summary of Results

In 2024, the City conducted approximately 8,000 water quality tests. **Table 1** summarizes the number of analyses and percentage meeting MECP Standards. Also included is the percentage of samples meeting the MECP Standards in St. Catharines and the Provincial Average.

Table 1: Number of Distribution System Samples and Percentage of test results meeting MECP Standards

Parameter	Number of Samples Taken	Compliance
Microbiological - E. Coli	1,573	100%
Microbiological - Total Coliforms	1,573	99.9%
Microbiological - Background	1,573	100%
Microbiological - Heterotrophic	689	100%
Chemical - Trihalomethanes	12	100%
Chemical - Haloacetic Acids	12	100%
Chemical - Chlorine Residual	2,504	99.8%
Chemical – Lead (distribution system)	10	100%
St. Catharines – Average		99.9%
Provincial - Average		99.9%

Summary of Adverse Water Quality Incidents

An adverse water quality incident occurs when a test result does not meet the MECP Standards. It does not mean the drinking water supply is unsafe, it simply indicates on that one

occasion, a drinking water quality standard was exceeded. In 2024, seven Adverse Water Quality Incidents (AWQI) took place.

After each adverse water quality incident, a series of actions are required to ensure the safety of the water and compliance with provincial legislation. The City's Standard Operating Procedures provide clear and detailed instruction for follow up actions. This involves flushing hydrants located in the area of the adverse incident, taking additional water samples from the original location and locations around the adverse incident. It also involves notifying the MECP's Niagara office, the Spills Action Centre (SAC) and the Public Health Department both verbally and in writing. **Appendix A** summarizes the adverse water quality incidents which occurred, and the corrective actions taken to resolve those incidents.

Lead Exceedances

As part of the Community Wide Lead Testing Program, the City will take samples from within private residences. The results are property-specific, and not indicative of the quality of the water throughout the distribution system. When sampling for lead, the results represent the water sampled from private plumbing within that residence. Potential lead sources include older lead water service lines, usually built prior to the 1950's; internal plumbing, used mainly in the early 1900's; and older brass or bronze fittings and fixtures. When a lead exceedance occurs, both the Public Health Department and the MECP are notified. The affected resident is also immediately notified and a package containing the results and informational fact sheets detailing what options are available to the resident are provided. All of the testing done through the Community Wide Lead Testing Program is done on an as-requested basis. There were two lead exceedance found on private property in 2024.

Replacing Lead Water Services

The City replaces public-side lead service lines when they're encountered during watermain replacement projects; when an exceedance is found through the Community Wide Lead Testing Program; or if a resident first replaces their private-side service. In 2024, 22 metres of lead service piping were removed, bringing the total to 507 metres replaced since 2015. Lead lines are replaced with either copper or plastic service lines.

Operational Activities

Water System Disruptions

Disruptions to the water distribution system typically are due to unplanned maintenance required in the system. In addition to watermain break repairs, this can include any repairs to service lines, valves, and hydrants. Many of these repairs require the water to be shut-off resulting in a disruption of water service to customers. **Table 2** summarizes water disruptions in 2023 and 2024 respectively.

The Province's Watermain Disinfection Procedure outlines the requirements for responding and repairing watermain breaks. It includes a sampling procedure for post watermain break repairs; and requirements for classifying each break and documentation of each break.

Table 2: Number of Service Disruptions, 2023 & 2024

Number of:	2023	2024
Watermain break repairs	62	74
Other repairs*	75	53
Other**	1	0
Affected properties***	2,546	2,475

*Includes repairs to hydrants, valves and water services
** Includes unplanned service disruptions in a Construction zone
*** the number of properties without water due to an unscheduled disruption (i.e., water shut off during the repair).

New Watermain Commissioning

When a new watermain is installed, the City is required to sample for microbiological parameters and chlorine residual. In 2024, there were 240 samples taken to test the new watermains before being put into service. If any bacteria are present, the new watermains are flushed, rechlorinated and sampled again until no bacterial contamination is found before being put into service. All the watermains must also meet the required standard for chlorine residual.

Maintenance Costs

In the 2024-2026 budget cycle, approximately $13.8 million was budgeted in 2024 for watermain capital projects. The cost of repairs in 2024 including watermain breaks; service repairs and upgrades; hydrant repairs and replacements; and valve repairs and replacements was approximately $320,000.

Water Flows

Table 3 lists the monthly water flows from the Decew Water Treatment Plant to the City of St. Catharines (source: Regional Municipality of Niagara).

Table 3: Monthly Water Flows for 2023 & 2024		
Month	Quantity (MegaLitres)	
	2023	2024
January	1,080	1,263
February	997	1,170
March	1,096	1,104
April	1,047	1,058
May	1,222	1,323
June	1,294	1,251
July	1,280	1,454
August	1,199	1,411
September	1,218	1,240
October	1,107	1,225
November	1,108	1,295
December	1,316	1,196
Total	13,964	14,992
Monthly Average	1,164	1,249
Daily Average	38	41

Note: 1 MegaLitre (ML) = 1,000,000 Litres
Additional information about the Decew Water Treatment Plant is available at: www.niagararegion.ca.

Drinking Water Quality Management System

A Drinking Water Quality Management System (DWQMS) is in place for the City's Water Distribution System. The DWQMS implements a systematic "continuous improvement" approach to planning, operations, corrective actions and management review to allow an organization to demonstrate sound system performance. The success of a DWQMS depends on the commitment from all levels and functions of an organization including operational staff and top management. The DWQMS is documented through the Operational Plan. The Operational Plan is regularly reviewed and updated.

In addition, internal audits take place, and a yearly risk assessment is conducted and/or reviewed. The risk assessment was designed to meet the DWQMS standard and includes climate change hazards. Integrating climate hazards into existing workplans can help address these risks as well as provide context compared to other known risks (e.g. aging infrastructure). The higher risks to the drinking water system include staff shortages (e.g. pandemic, strike, lockout, lack of available staff etc.), supply issues from the Region of Niagara Decew Water Treatment Plant (loss of supply or contamination of the water supply), contamination of the distribution system (backflow, watermain breaks) and lead water services.

Investing and Planning in the Future

Residents trust the City for safe, clean, and reliable drinking water every time they turn on their tap. St. Catharines is proud to deliver on those expectations. The City is committed to long-term investments in its water infrastructure to improve quality, reliability, and resilience while reducing maintenance costs.

Additional Information

This report ensures transparency and compliance with Ontario's Safe Drinking Water Act.

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Notice
Please note that every reasonable effort is made to ensure the accuracy of this report. This report is published with the best available information at the time of publication. In the event that errors or omissions occur, the online report will be updated. Please refer to the online version of the report for the most current version.

Appendix A: Adverse Water Quality Incidents - 2024 Summary

Date	Location	Parameter	Result	Corrective Action
July 12	27 Considine Av. Blowoff 45 Renown Rd. Hydrant 2 Northrup Cres Hydrant	Chlorine Residual	0 mg/L	Flushed area, resampled, restored chlorine levels. Resolved July 12.
July 31	27 Considine Av. Blowoff 45 Renown Rd. Hydrant	Chlorine Residual	0 mg/L	Flushed area, resampled, restored chlorine levels. Resolved July 31.
August 6	320 Geneva St. Hydrant	Chlorine Residual	0 mg/L	Flushed area, resampled, restored chlorine levels. Resolved August 6.
December 2	104 Lake St.	Total Coliform	7 CFU /100mL	Flush area, resampled, met standards. Resolved December 6.