



Kitchener Utilities

City of Kitchener Drinking Water Distribution System

**Drinking Water Quality Management
Standard**

Management Review – 2023

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PART A - INTRODUCTION

Purpose

The purpose of this report is to inform the decision-making authority about the status of the drinking water system. The Drinking Water Quality Management Standard (DWQMS) under the Ministry of Environment, Conservation and Parks (MECP) requires management to review and evaluate the continuing suitability, adequacy, and effectiveness of the Quality Management System at least once a calendar year and that the results of the management review, identified deficiencies, decisions and action items are provided to Council as the ‘Owner’ of the drinking water system.

Executive Summary

Highlights of the report are:

- The Summary Water Report-2023 (INS-2024-051) confirmed that the drinking water system was in compliance with regulatory water sampling requirements during 2023. The DWQMS Management Review confirms the continuing adequacy and effectiveness of the quality management system which includes compliance, customer feedback, operational performance, audit information etc. as outlined in this report.
- The Water Infrastructure Program (WIP) maintenance achievements (specific areas of improvement identified by WIP):
 - Cleaned approximately 151km of watermain in 2023. In 2023 the six-year cycle program was restarted with the area previously cleaned in 2017.
 - Water quality complaints continue to decrease. There were 97 complaints total with 19 discoloured water complaints for 2023; which has decreased slightly from 2022.
 - 19 broken valves and/or failing valves were either replaced or removed which allows for quicker isolation for water emergencies. This number does not include the majority of valve replacements through road reconstruction projects. Broken valves are tracked in real time and the majority are addressed within weeks (except for winter or if they are part of future reconstructions).
 - Approximately 1,395 valves were proactively operated (17%); the majority were within the watermain cleaning area and the 2023 reconstruction areas. Critical valves along the Light Rapid Transit (LRT) were operated (critical valves should be operated more frequently). Operating valves ensures that they will work when they are needed in an emergency or for construction activities.
 - Completed spring and fall maintenance of fire hydrants. Hydrant mobile field inspections were rolled out in spring 2023 which improved efficiencies by minimizing data entry and provide faster deficiency follow-up.

DWQMS Management Review

- Underground utility locates – continued to meet regulatory requirements with a combination of in-house and contract staff (14,284 locates completed from January to November; December values are not yet available).
- The Backflow Prevention program (BFP) was moved to AMANDA which provides real-time customer information and better tracking of devices. Data clean-up from the conversion is on-going and it is anticipated that compliance will increase from both the data clean up and the better customer notification/tracking process for both new devices and testing of current devices. Currently the new system is reporting that 1,930 services are protected by BFP devices – the focus is on high risk use. On-line payment for permits (the Building Department) made it easier for the customer to obtain permits for new device installations.
- A Regulatory relief was provided by the Ministry to limit the spring 2023 lead testing program (customer premises) to hydrants only due to COVID restrictions. The fall lead testing program was completed without any relief.
- An inspection of approximately 120 air relief valves in chambers was completed and chambers pumped, as required. There were 2 boulevard style air reliefs installed in 2023 to eliminate flooding risk within the chambers.
- There were 44 watermain breaks in 2023, which is below than the 5-year average of 73.
- Approximately 600 aging/problem water meters were replaced. The meter replacement program was largely paused in 2023 pending the Advanced Meter Infrastructure (AMI) direction from the WIP. The City is not moving forward with AMI for the next WIP cycle (2024-2027) so the previous annual meter replacement targets will resume (approximately 5,000 in 2024).
- Approximately 350 hydrants were painted as part of the corrosion protection program, painting will continue in 2024. Hydrants are also stencilled with the watermain diameter for the Fire Department.
- Unaccounted for water was 9.9% (At the 10% industry target). The unaccounted for water generally fluctuates around 10% (9-12%), with 10% being the approx. 10 year average).
- Pressure reducing valve maintenance was completed.
- Replaced watermains as outlined in the 2023 City of Kitchener Engineering & Water Utility Capital Forecast.
- The Operational Plan was Re-Endorsed by Council (INS-2023-012) and the Financial Plan (INS-2023-013) was approved.
- The Drinking Water Licence renewal application was submitted in 2023 prior to the 2024 expiration.
- External audit determined that the management system is effectively implemented and maintained and recommended continued certification of accreditation for the municipal drinking water system.

DWQMS Management Review

- In 2023 the City Auditor undertook a corporate wide review of our locating processes. As a result of this review, council approved the new positions of: Supervisor, Damage Prevention, four new Locators, Damage Prevention and one new Draftsperson. These positions will also allow the corporation to respond in more timely manner in accordance with the new Ontario One Call Regulations.
- ArcReader (Utilities' mapping solution) replacement roll-out has begun with the Damage Prevention group. It is critical that key utilities staff have access to GIS/drawings even if there are network outages. It is anticipated that there will be different solutions for the different staff/emergency response needs.
- Engineering hired the additional resource to address the last outstanding item related to the 2020 Ministry of Environment, Conservation and Parks (MECP) inspection which flagged that "The owner did not have up-to-date documents describing the distribution components as required. As-builts and GIS mapping is required within 12-months from when a new watermain is commissioned". Processes continue to be improved to map/remove infrastructure related projects.
- A mapping clean up project commenced to compare the as-builts to the mapping. Additional Quality Assurance/Quality Control (QA/QC) processes have been developed to review new mapping changes in a timely manner. Approximately 20% of the City has been checked/corrected which results in several new valves to be mapped (and therefore added to maintenance), corrections on services locations. Accurate mapping is critical for emergency response and maintenance.
- New Utilities Water Engineer position was filled in early 2024 to address the growing demand on the water utility.

Continuing Areas of Focus are:

- Continue with the mapping QA/QC for the remainder of the City.
- Build upon the success of the hydrant spring mobile field inspections and develop a fall mobile field inspection.
- Support the City's Official Plan update with a water distribution analysis component to identify any water upgrades required and/or potential limitations.
- Proceed with new mapping solution to replace ArcReader infrastructure mapping.
- Continue with hiring staff within the Damage Prevention Team.

Background

One of recommendations from Justice O'Connor's Part Two Report of the Walkerton Inquiry was "The Ministry of the Environment should require the owners of municipal water systems to obtain an owner's licence for the operation of their waterworks". Justice O'Connor also recommended that the Owners and Operating Authorities of these systems implement a quality management approach to operations and management. As a result of these recommendations a Drinking Water

Quality Management Standard (DWQMS) under the *Safe Drinking Water Act, 2002* was released in October 2006.

The *Safe Drinking Water Act, 2002* and *Regulation 188/07*, requires the City of Kitchener to be licensed to operate and maintain Kitchener's Water Distribution System. Some of the licensing requirements include the development and management of a Quality Management System (QMS) and Operational Plan as well as communication to the Owner. The City of Kitchener became licensed in August 2009 with a Financial Plan originally submitted in July 2010. Renewals of the Licence and Financial Plan were complete and brought forward to Council in 2014, 2018, and 2023, and every 4-5 years thereafter prior to each Drinking Water System License renewal. An application for licence renewal was made in late 2023.

Section 19 of the *Safe Drinking Water Act, 2002* imposes a statutory standard of care on persons who oversee the municipal drinking water system: "...every person who, on behalf of the municipality, oversees the accredited operating authority of the system or exercises decision-making authority over the system." This standard of care includes Council since they have decision-making authority as the "Owner" of the system. Part of the standard of care includes requiring system owners to undertake financial planning and implement a QMS.

The following link is a guide for municipal councillors to help understand their responsibilities under the *Safe Drinking Water Act, 2002* and provides information on how Ontario's drinking water is safeguarded: [Taking Care of Your Drinking Water: A Guide for Members of Municipal Councils | ontario.ca](https://www.ontario.ca/taking-care-of-your-drinking-water)

Three things to remember as a municipal councillor (as outlined in the above Guide):

- It's your duty. There are legal consequences for not acting as required by the standard of care, including possible fines or imprisonment.
- Be informed. Your decisions can have an impact on public health. You don't have to be an expert in drinking water operations, but you do need to be informed about them.
- Be vigilant. It is critical you never take the drinking water safety for granted or assume all is well with the drinking water systems under your care and direction.

Other Related Water Quality Reports

The City of Kitchener Summary Water Report for 2023 is a regulatory report provided to Council, which provides a summary of drinking water including adverse water quality incidences and water volume.

The Kitchener Distribution System prepares an annual summary of the number of tests taken within the distribution system as well as the range of the results. A copy of this report is available on the Kitchener Utilities website.

The Kitchener Distribution System is part of an Integrated Urban System, meaning the Regional Municipality of Waterloo is responsible for water treatment and the development and operation of a trunk water network to distribute treated water to Kitchener, Cambridge, Waterloo, Woolwich, and Wilmot. There is a variety of groundwater supply wells (80%), treatment facilities as well as a Grand River (20%) source. The Region of Waterloo's water infrastructure system is complex, consisting of numerous supply sources, pressure zones, reservoirs, and pumping stations. Ensuring sufficient pressure and quantities to meet current and planned growth requires a long-term, co-ordinated strategy. The Region provides annual summaries for each supply and the information is available on their website with a link available at the Kitchener Utilities website.

A portion of Kitchener (River Ridge area) is supplied by the City of Waterloo. Kitchener supplies water to a small section of Waterloo (Ira Needles area) and water travels through the Kitchener distribution system to Breslau (Woolwich). The City of Waterloo's water quality report is available on their website.

Quality Management System Policy

Kitchener Utilities owns, maintains, and operates the City of Kitchener's Drinking Water Distribution System. At Kitchener Utilities, we are committed to supplying the City with safe drinking water. We work together as the City of Kitchener and the Region of Waterloo to keep water matters top of mind. We are committed to these principles:

1. Quality

Kitchener water is safely treated and regularly tested according to government legislation and regulations for the consistent delivery of safe, quality drinking water. We are committed to maintaining and continually improving the Quality Management System and complying with applicable legislation.

2. Trust

Trust us to look after your water needs by delivering quality water and reliable service.

3. Value

Tap water is the most economical choice.

4. Communication

We will communicate openly with the public concerning matters of drinking water quality.

PART B – MANAGEMENT REVIEW

System Description

The scope of the waterworks begins at the point where treated water enters the watermain from the treatment facilities and ends at the property lines of the consumers. There is no storage, chlorine boosting, secondary disinfection or pressure boosting within the control of the waterworks.

At the end of 2023, the waterworks consists of approximately:

- 929.4 km of distribution watermain – 795.6 km Kitchener owned, 23.5 km Dual owned (joint ownership between Kitchener and Region) and 110.3 km Regional owned .
- 71,653 water meters in service.
- 4,742 hydrants (not including private hydrants).
- 8,138 valves (not including service valves or hydrant valves) – 7,554 Kitchener owned, 129 Dual and 455 Regional.

(See **Appendix** for a map at end of this document)

The waterworks system has the following permits and licences:

- Municipal Drinking Water Licence
- Drinking Water Works Permit
- Financial Plan
- Operational Plan

Water Infrastructure Program (WIP)

The 2024 WIP Summary and Rate Options Report (INS-2023-437) was brought forward to Council in 2023 to address capital and maintenance requirements and rates for 2024-2027. Drinking water related highlights of the report include:

- Continue with maintenance programs identified in previous WIP
- Continue with triple funded utility replacements (there were significant cost increases due to a number of factors including higher fuel prices and sharp increases in inflation)
- Identified additional water only replacement projects to address poor condition watermains where other water utilities (storm and sanitary) and the road surface are in good to fair condition. These projects are not suitable for the triple funded utility replacement program. Target watermains that are of the highest risk for failure/service disruption and remove pipes that have a high break occurrence and/or unreliable material type.
- Shared resource to improve data management and risk prioritization (anticipated in 2025)

DWQMS Management Review

- Shared Equity/Affordability Study & Customer Affordability Programs which includes doubling the current leak adjustment policy (2024) and rate model review (anticipated in 2025)
- Shared Enhanced Community Engagement
- Additional funding to raising air relief valves/chambers in areas prone to flooding to reduce the risk of drinking water contamination

The Water Infrastructure Program (WIP) was initiated in spring 2017. Targets for the final year of maintenance-related work were achieved, included:

- Watermain cleaning program - cleaned 168km of the City.
- Valve maintenance and replacement programs – operated approximately 1,395 valves and replaced 19 broken or failing valves.
- Hydrant operation and maintenance – completed as required.
- Underground utility locates – continued to meet regulatory requirements with a combination of in-house and contract staff (14,284 locates completed from January to November; December values are not yet available).
- Approximately 1,930 services are protected by Backflow Prevention (BFP). Due to ongoing data clean up, the exact number of devices will not be reportable until 2024.

COVID Impacts

- A regulatory relief was provided for the spring lead sampling program – hydrants were only sampled, no internal sampling. The fall program was resumed to pre-COVID levels.

Incidents of Regulatory Non Compliance

A Ministry of Environment, Conservation and Parks (MECP) completed an inspection on June 8-20, 2023, and covered June 24, 2022 to June 28, 2023. There were no notices of non-compliance.

Incidences of Adverse Drinking Water

There were 20 Adverse Water Quality Incidences (AWQI) during the year. Two self-imposed Boil Water Advisories (BWA) were initiated in 2023. The volume of AWQIs increased slightly from 2022, the majority of the increase was related to temporary watermains used during construction. Temporary watermains are particularly sensitive as they are above ground systems influenced by the water heating up in warmer temperatures. This may increase the potential for bacteriological growth. Warmer weather seems to increase the incidences of Total Coliform. The additional challenge with temporary watermains is the sample port is located outside and subject to unsanitary conditions. Many contractors remove the sampling ports when not in use because they are subject to vandalism/theft. These ports need to be maintained in a sanitary condition between uses. The general nature of reconstruction projects often leads to “false positives”, where the results received are more reflective of what is on the sampling tap, rather than what is in the water.

DWQMS Management Review

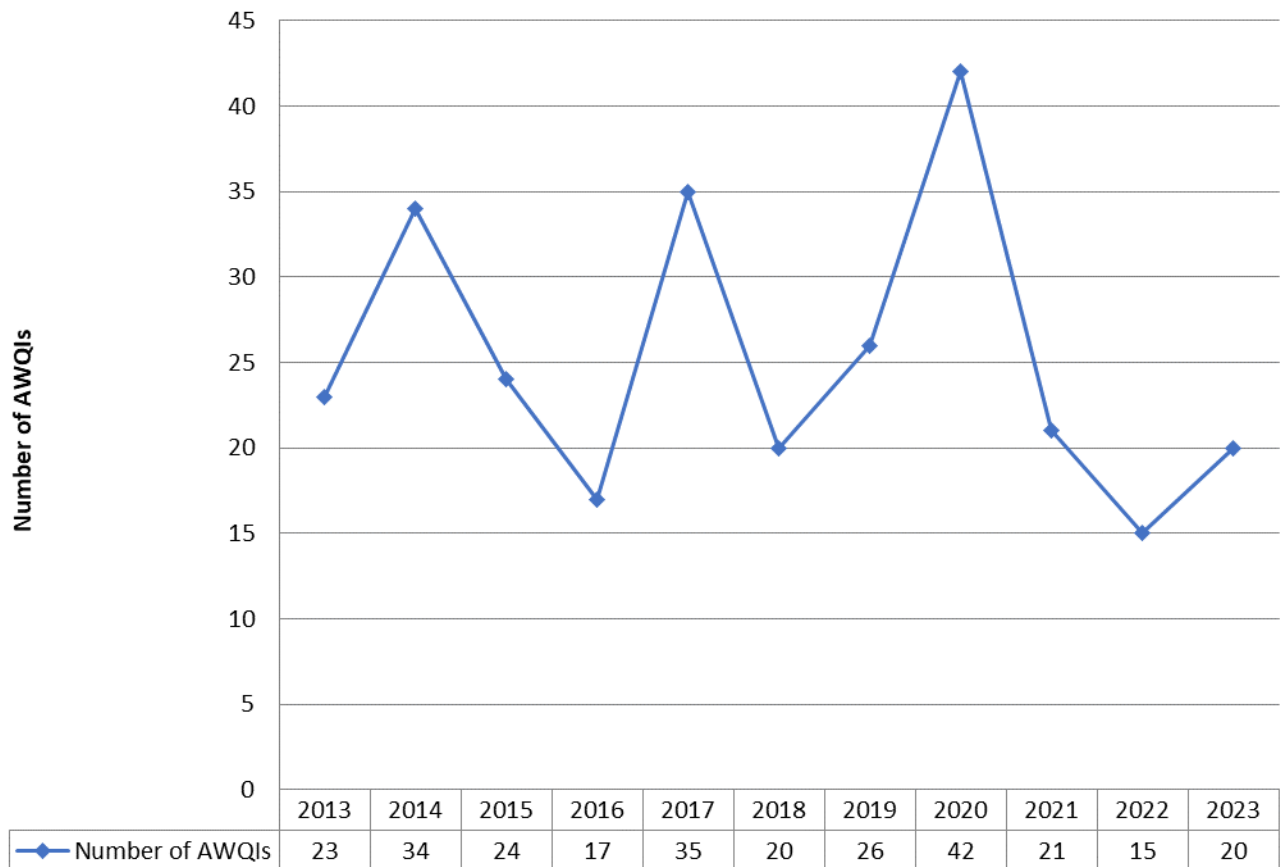
Every positive result is reportable, and resampling must occur in accordance with regulations. When the resamples are clear, it is an indication that the issue was with the sampling port, not in the water. Additional communications efforts to contractors regarding the importance of maintain the sampling ports in a sanitary manner was made over the 2023 construction season. These communication efforts will continue for 2024 and beyond.

- Low chlorine AWQIs (3 total)
 - Two were in areas of new subdivisions with no houses yet built. Along with dead ends, KU proactively flushes new areas until there are homes built and water is being used. One was at the new community centre at 80 Tartan Ave.
- Total coliform AWQIs (14 total)
 - Twelve were at temporary main sampling locations.
 - One was at a distribution sampling location.
 - One was at a new service.
- Self Imposed Boil Water Advisory (BWA – 2 total)
 - Watermain break on River Rd E and Frederick
 - 272 Belleview Ave – potential contamination
- Lead:
 - There was one lead adverse reported in 2023 on a hydrant during our spring lead testing program; however the resample was below limits. There were three lead exceedances were reported in 2023. The same residence was reported after three separate test results (initial result, resample to confirm and a third after the customer replaced the lead service). The homeowner participated in our fall lead testing program knowing they had lead pipe on their private side and then had their water tested again after having their lead pipe removed.

In general, corrective actions include reporting, flushing and resampling. The above AWQIs were all resolved. The Summary Water Report for 2023 discusses water quality compliance and corrective actions further.

Action: No further action required – for information only

Adverse Water Quality Incidents (AWQIs)



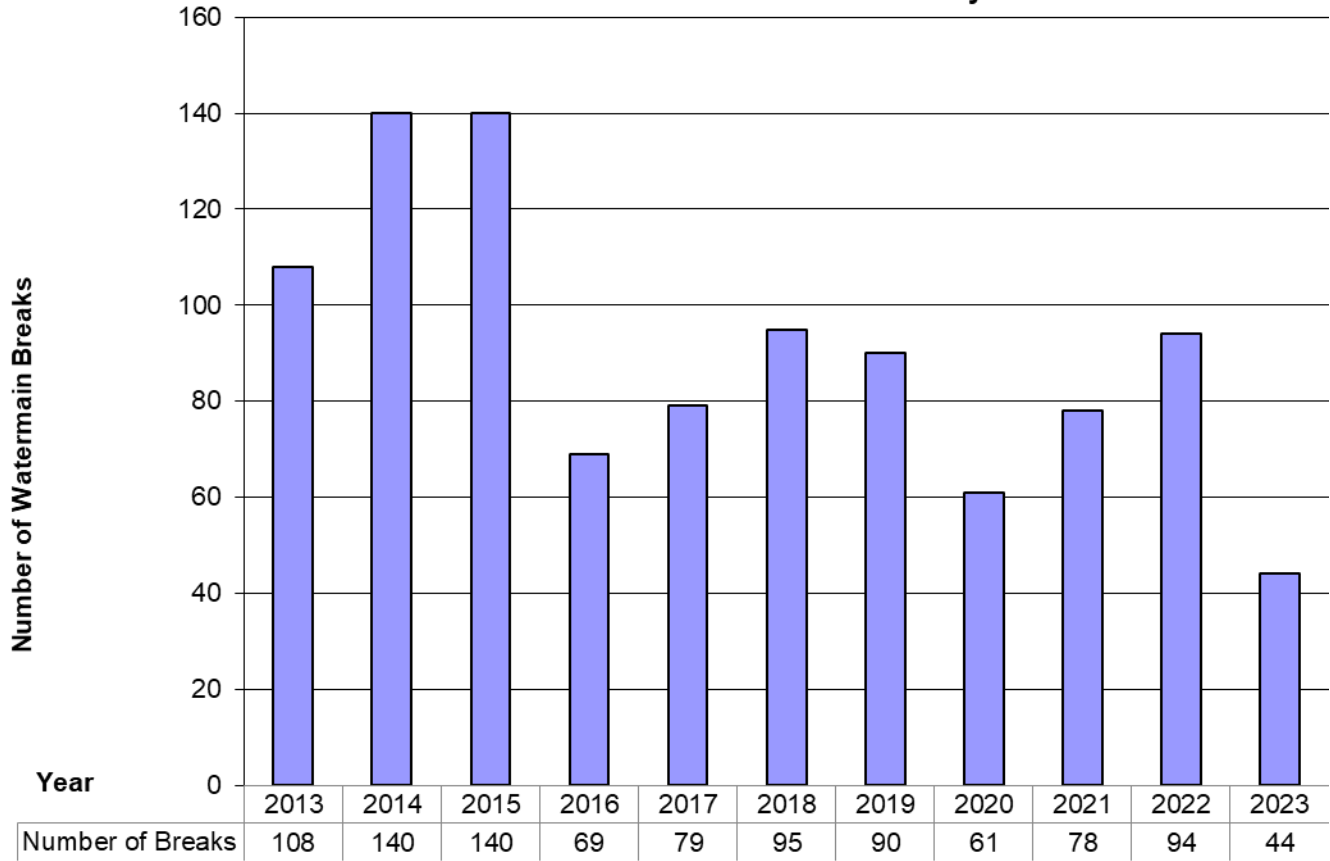
Deviations from Critical Control Points Limits and Response

- There were 44 watermain breaks in 2023, which is lower than the 5-year average of 73 (the 5-year average also dropped). Of the 44, 9 were deemed to be Category 2. Category 2 watermain breaks require bacteriological sampling upon completion. Watermain breaks are influenced by the watermain age/condition, material type, and is also heavily weather dependent due to the frost movement with colder winters resulting in more breaks. Incident debriefs are completed for watermain breaks and break history is included as part of asset condition. This information helps to determine priorities for replacement due to condition.

City of Kitchener Water Distribution

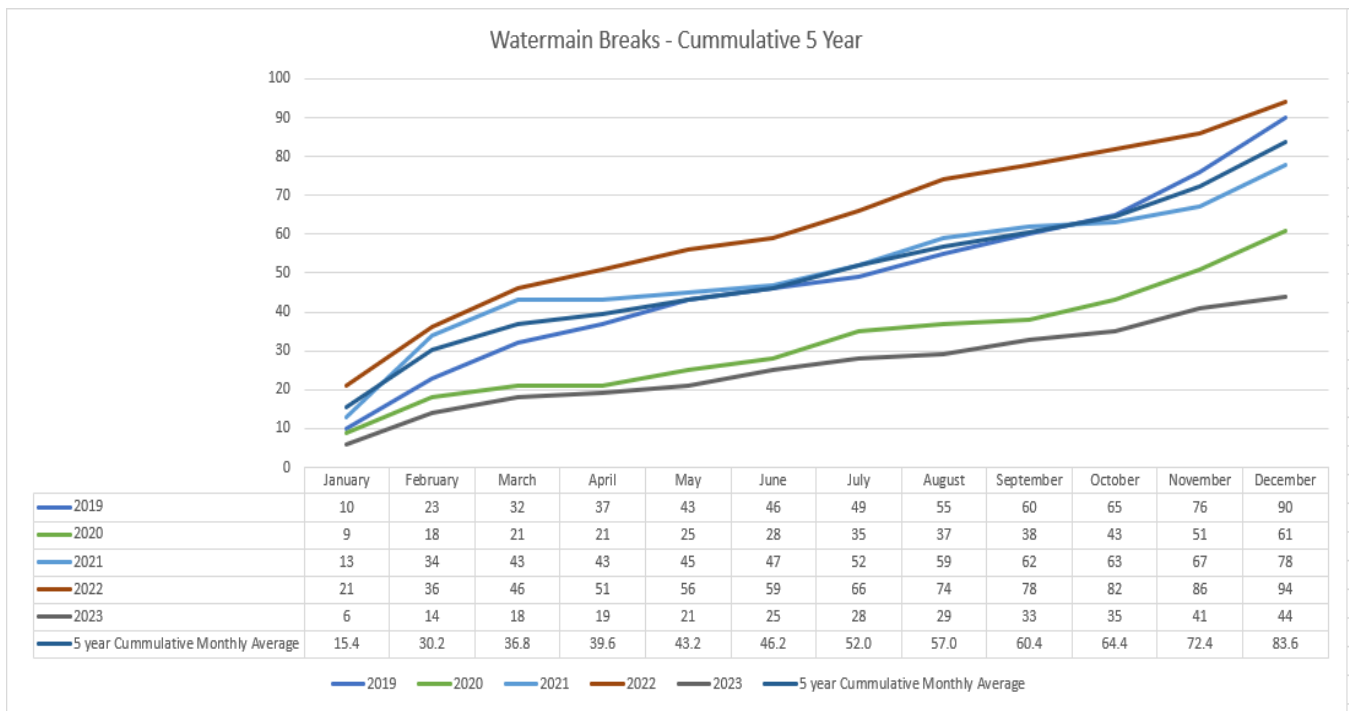
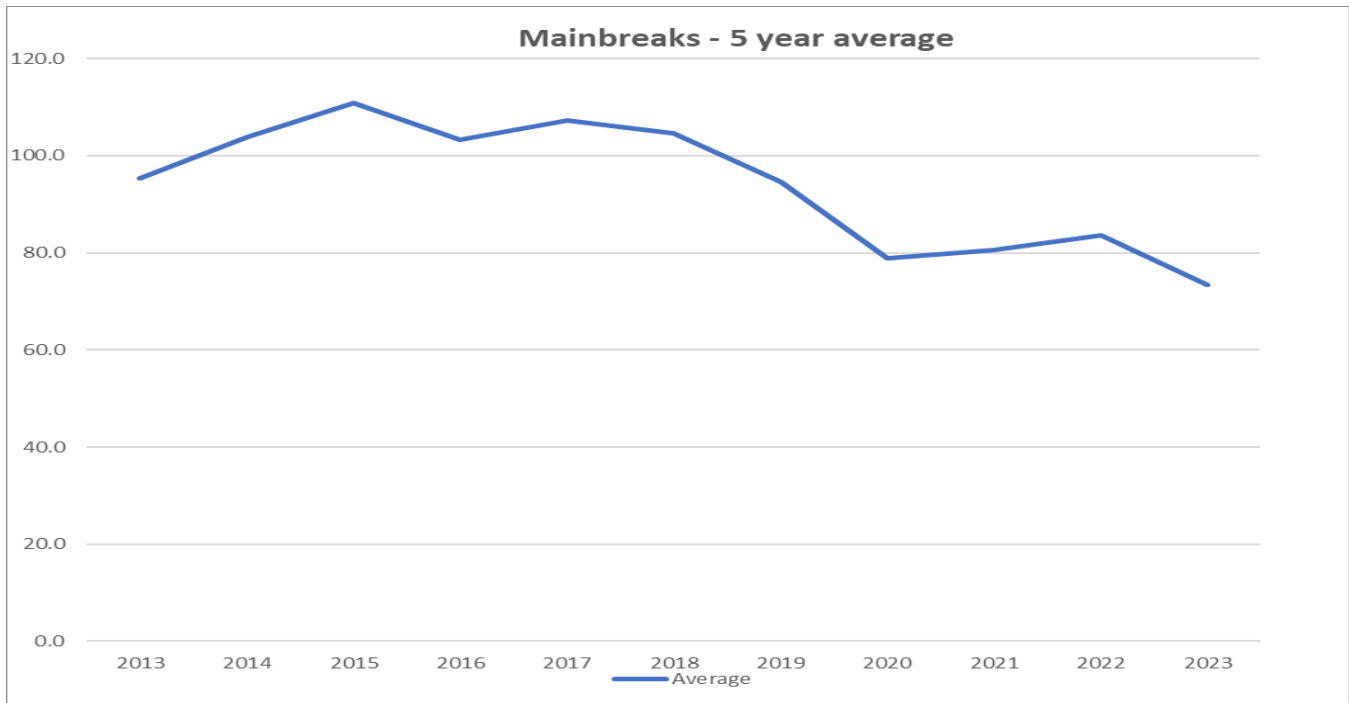
DWQMS Management Review

Number of Watermain Breaks by Year

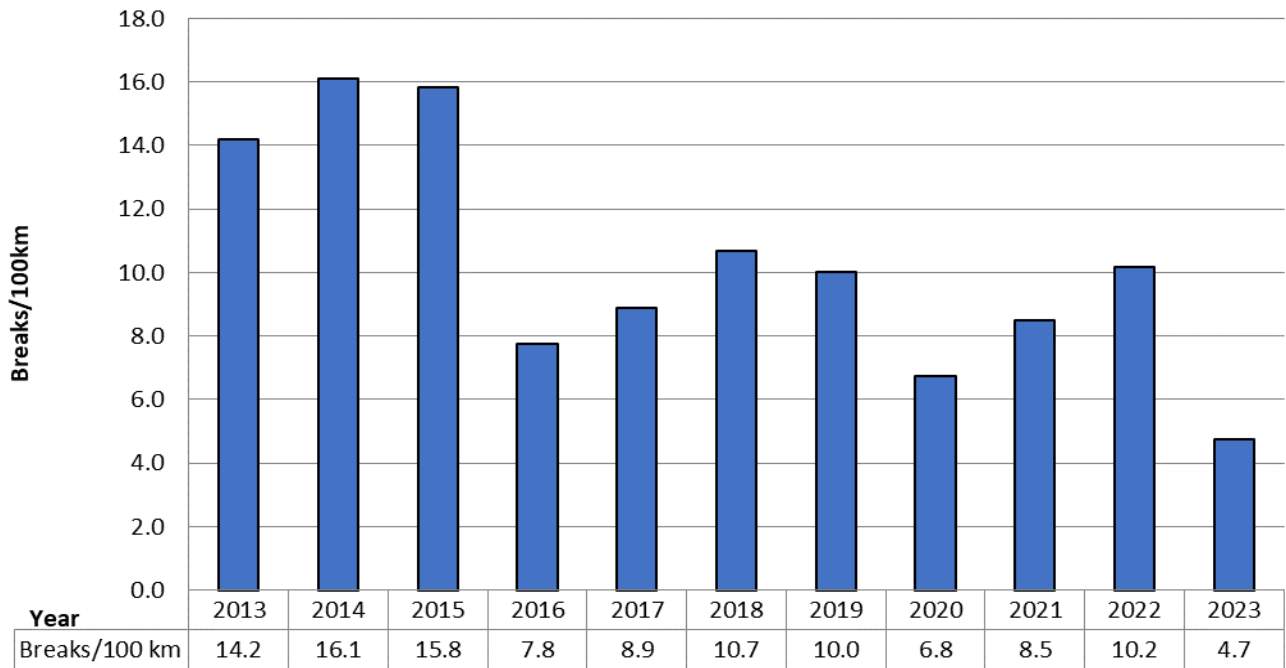


City of Kitchener Water Distribution

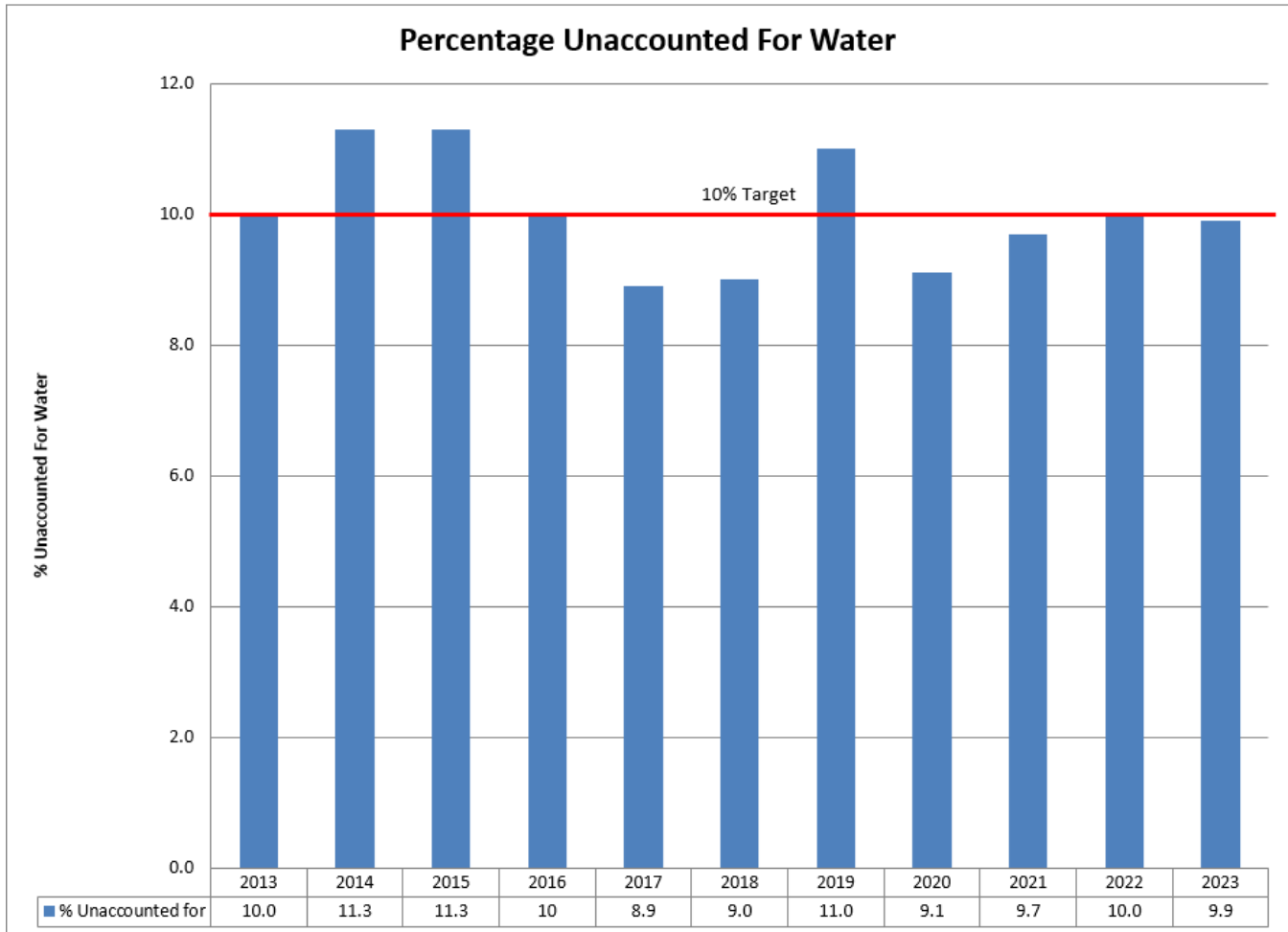
DWQMS Management Review



Number of Watermain Breaks per 100 km



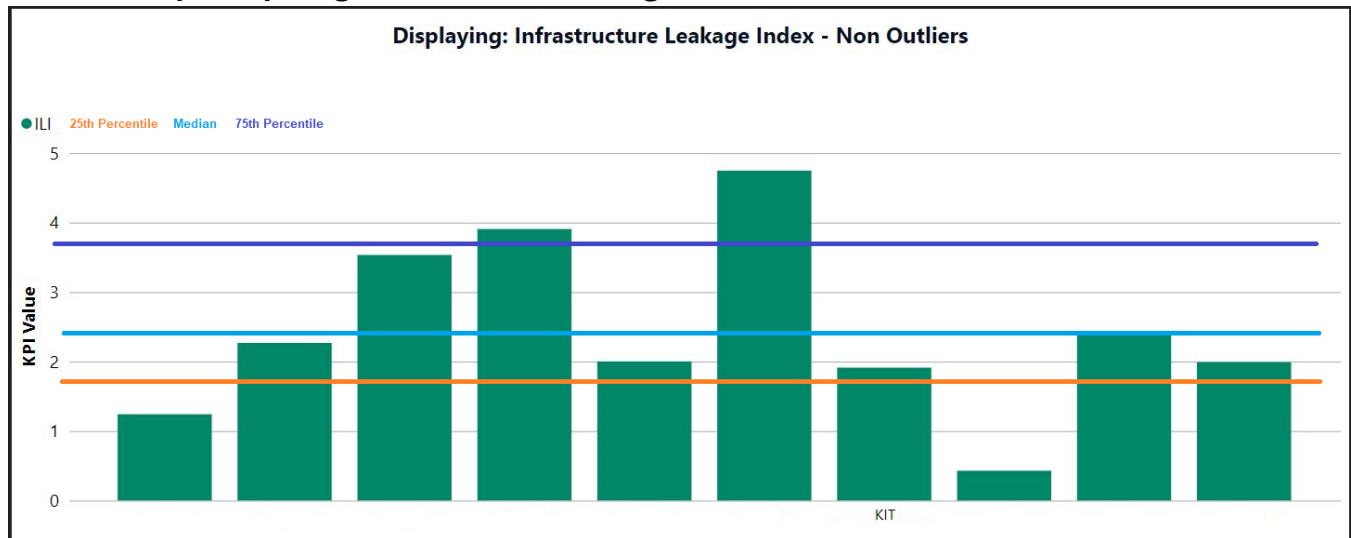
- Unaccounted for water for was 9.9%; the MECP target is 10%. Water loss includes water used for construction watermain commissioning (e.g., new mains and replacement mains), water for temporary main supply during reconstruction, and water use for reactive flushing). The 10-year average for Kitchener is 9.9%, although the percentage fluctuates.



- Infrastructure Leak Index (ILI) is a performance indicator which is the ratio of the level of Current Annual Real Losses (CARL) to the Unavoidable Annual Real Losses (UARL). The UARL considers the total length of watermain in the distribution system, number of hydrants, average pressures, number of service connections, length of service and hydrant connections. The UARL is the theoretical low limit of leakage that could be achieved if all the current best leakage management could be implemented. The UARL is specific to each water system. For example, the UARL for a large system with high pressure will be higher than a small system with low pressure. Leakage in any water system can never be totally eliminated. One caveat is that the calculation is made based on an average pressure. Kitchener has several pressure zones with a great deal of variation across the city. As part of the National Water and Wastewater Benchmarking Initiative (Benchmarking), Kitchener recently began reporting ILI and trending will be established as more data is generating. Benchmarking is completed on the previous year's data. The 2022 ILI value was 1.91 meaning the current level of real losses is 1.91 times greater than the theoretical low level losses. The

ILI graph is a comparison to other Cities participating in 2022 benchmarking (Kitchener is below the median of 2.3).

ILI for cities participating in 2022 Benchmarking



Action: No further action required – for information only

Effectiveness of the Risk Assessment Process

- A risk assessment was completed on November 23, 2023. The purpose of the risk assessment is to brainstorm potential risks and identify counter measures, where appropriate. The following is a summary for the 2023 risk assessment:
 - Reviewed all risks to ensure all information and assumptions are current and valid.
 - Discussed and added the following new potential risks as well as potential counter control measures:
 - No incoming water material quality checks.
 - Cycle counting of critical water materials to reduce potential shortages.
 - KU Staff working on water related activities alone.
 - Watermain break sedimentation able to enter a creek/stream.
 - Water materials stored in the Annex are not in a controlled environment.
 - Preventive / Control measures and risk scores were updated for several existing risks and added for the new risks above.
 - Three previously identified risks were removed from the risk table.

Action: For Information Only

Results of External and Internal Audits

The DWQMS Standard is divided into Plan, Do, Check, and Improve sections. Audits are completed to analyze processes to confirm that what is stated in the procedures and work instructions is what is being done. External Audits are completed by a third party while Internal Audits are completed by accredited City staff.

External:

- In November 2023, a 12 Month Surveillance audit was conducted and completed by a certified external auditor (SAI Global) recommending continued accreditation for the City of Kitchener.
 - No non-conformances were found. One opportunity for improvement was identified.

Internal:

- 5 Field/Process audits were conducted in 2023:
 - Routine Water Quality Sampling
 - Erosion and Sediment Control
 - Watermain Commissioning
 - Records Review
 - Stores Supplies and Services Review
- 11 Element audits were conducted in 2023.
- 25 opportunities for improvement were identified from internal audits in 2023:
 - 10 (40%) of these opportunities have been acted upon and implemented;
 - 5 (20%) of these opportunities could not be implemented; and
 - 10 (40%) of these opportunities are still being investigated
- Zero nonconformances and zero non-compliances were found during the internal audits.
- Four nonconformances were found outside of the internal audits. Three of the four nonconformances have been resolved with one still open (training not yet completed):
 - Private side water service at 225 Victoria St was turned on by Building without KU approval.
 - A chlorine residual was not taken by the crew leaving the site or the new crew at the River Rd/Frederick St watermain break in May 2023.
 - A large amount of sediment entered Kolb Creek. The On-call Manager did not follow sediment and erosion control procedure.
 - A contractor cut off a water service without a KU Certified Operator present – still open (contractor training has been scheduled).

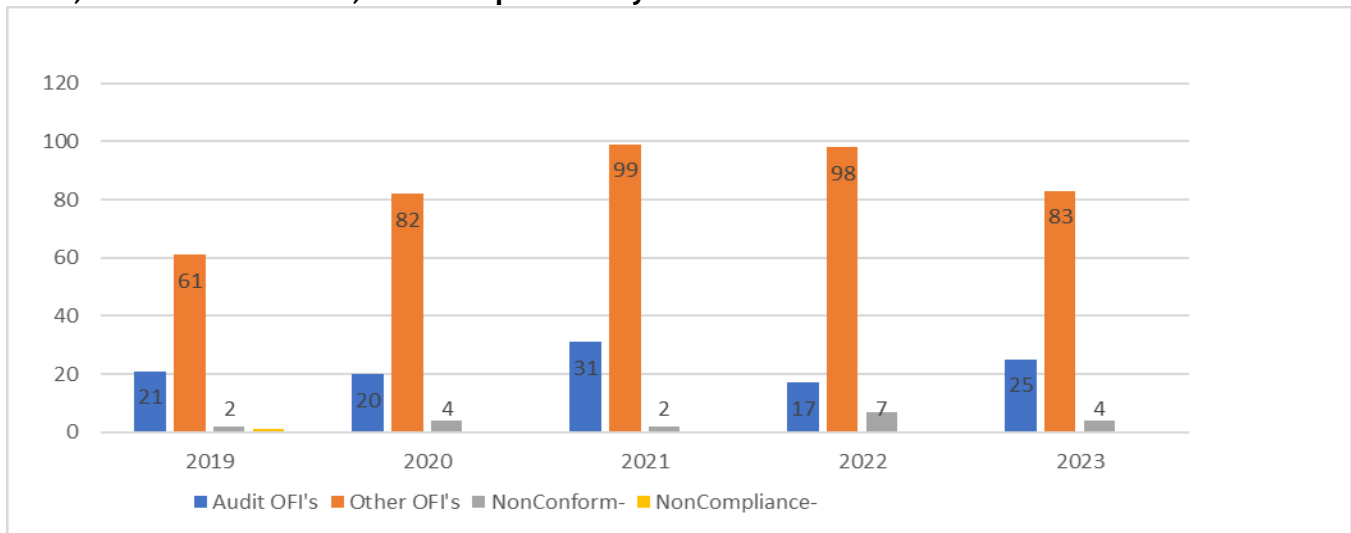
Continuous Improvement

Continual Improvement is a key element of all quality management systems and we are regulated to have a process to identify and implement preventative actions to eliminate the occurrences of potential non-conformities. Opportunities for improvement can come from many sources, such as

external audits, staff suggestions, public concerns, management reviews, debriefs, or the risk assessment meeting. Opportunities which have either been acted upon and implemented or are not implemented are communicated back to staff as part of regular meetings. In total for 2023, excluding the results from internal audits, there were:

- 83 opportunities for improvement, of which:
 - 46 (55%) of these opportunities have been acted upon and implemented;
 - 5 (6%) of these opportunities could not be implemented; and
 - 32 (39%) of these opportunities are still being investigated.

OFI's, Non-Conformances, Non-Compliances by Year



Action: The Continual Improvement Log is updated monthly to discuss new items, track process and circle back to determine the effectiveness of implementation. The log is reviewed annually with Top Management as part of the Management Review.

Results of the Emergency Response Training/Testing

- New On-Call Management Staff continue to take the IMS-100 Introduction to the Incident Management System (IMS) for Ontario training.
- Water Emergency – Management training was provided to supervisors and management in June 2023
- Debriefs are also completed for selected events. For example, debriefs after Boil Water and Drinking Water Advisories are completed to improve our processes.

Action: No further action required – for information only

Operational Performance

- Ongoing work with the Region for the Pressure Zone 2 and 4 Optimization – this will improve water pressures and supply in the southeastern end of the city. The majority of the work is Regional; however, there is coordination work with the City. The section between Strasburg Road and Robert Ferrie Drive is awaiting the completion of the Environmental Assessment for the Robert Ferrie Drive extension.
- Ongoing work to support the Region’s East Side Lands pressure zone changes, which includes the on-going installation of Regional watermain.

Action: No further action required – for information only

Raw Water Supply and Drinking Water Quality Trends

There are known seasonal issues with the water supply:

- Fall - Grand River temperature changes may cause odour challenges in the source water, which may increase flushing requirements.
- Winter – temperature extremes may cause more watermain breaks in the system.

The Greenbrook Water Treatment Plant was off-line for the majority of 2023.

Action: No further action required – for information only

Follow-up on Action Items from Previous Management Reviews

Action items were completed as part of the revised report and associated council report.

Action: No further action required – for information only

Status of Management Action Items Identified Between Reviews

There were no items identified between the management reviews.

Action: No further action required – for information only

Changes That Could Affect the Quality Management System

- The Federal government has a manganese limit, however the current provincial regulations, which Kitchener is required to follow only has an aesthetic limit. It is anticipated that the Province will follow the federal guidelines and implement a maximum allowable

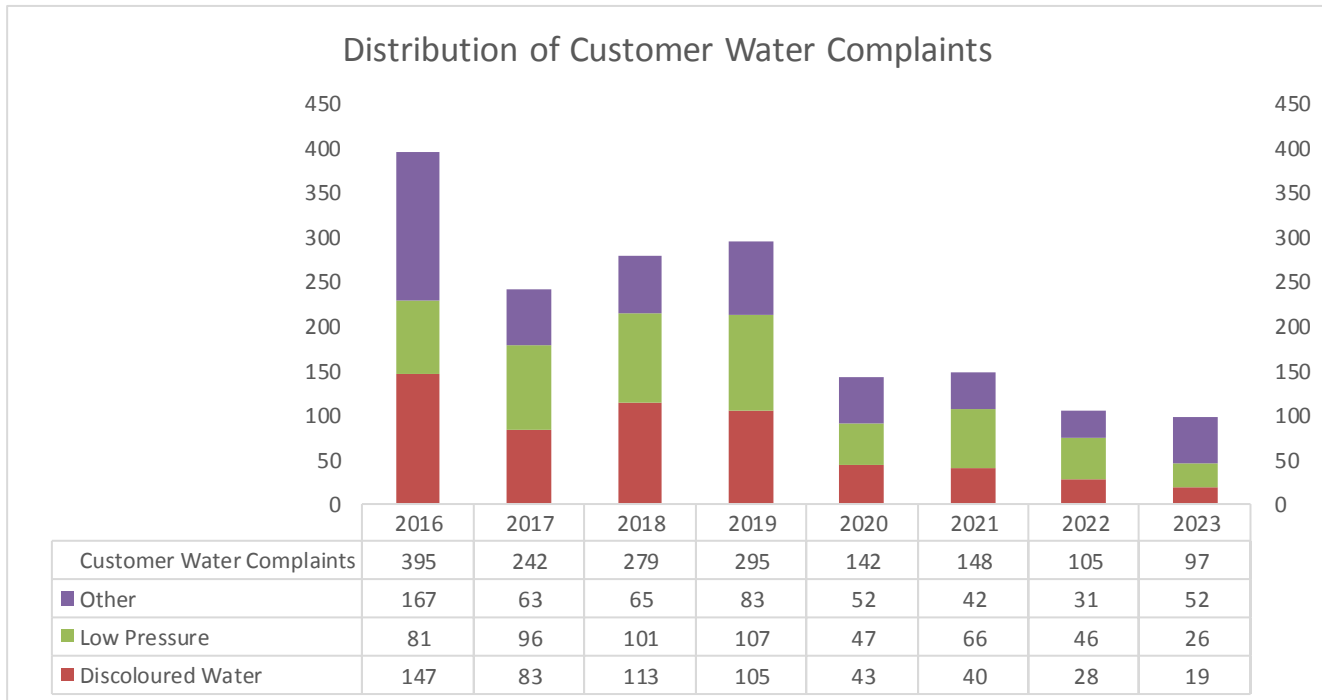
concentration. The Strange Street upgrades were complete in anticipation of this regulatory change.

- There are indications that the lead maximum allowable concentration will be reduced, which will likely increase the number of lead tests that exceed the regulatory limits. Customers are not required to complete any corrective actions when elevated lead exists. The City is required to flush and resample if there is a lead adverse in the distribution system. The City tracks streets with lead or suspected lead and includes them as part of the considerations for replacement. It is most cost effective to replace a number of lead services as part of a road reconstruction project, rather than individual services.
- Four Additional Dwelling Units (ADU) are now permitted on a number of residential lots. Historical residential areas in Kitchener have smaller diameter water services which may not support additional usage. The current residential water service standard is 25mm diameter. Kitchener Utilities will continue to work with the Building Department on requirements.
- The City will commence with an Official Plan update in 2024; which will include a water component to identify undersized watermain in infill areas and/or potential areas for concerns.
- Continue to support the City's development approval goals with respect to water with ongoing design/construction support throughout the process.

Action: No further action required – for information only

Consumer Feedback

- The number of customer water complaints continues to decrease. Dispatch staff guide customers through a number of questions to determine whether the problem is suspected to be internal (plumbing) or external (distribution system).
- The problem, cause, and remedy are tracked for each complaint.
- Discoloured water complaints are often the result of changes in flow in the system. This can be due to reconstruction, watermain cleaning, watermain breaks, valve replacement and other construction.
- Low pressure complaints are largely internal issues (softeners, internal plumbing).
- Other complaints include water hardness, no water, odour/taste, air in lines (white water), customer sample requests. We are seeing more residents moving into Kitchener who may not be familiar with water hardness and education is a component of resolving the concerns.
- In general, a number of customer complaints can be resolved by educating the customer (water hardness), flushing/sampling (discoloured water) or confirming private side issue (water softener, pressure reducing valve, drain issues)



Action: Continue with proposed watermain cleaning area in 2024.

Resources Needed to Maintain the Quality Management System

- The WIP report identified a shared resource to improve data management and risk prioritization; however this is not planned for 2024.

Action: No further action required – for information only

Results of the Infrastructure Review

- The WIP Review was completed which 2024-2027, which included water-only projects.
- Individual project selection is based on a number of factors including condition (watermain break history), material, criticality, watermain size, presence of lead services, shallow mains, and other infrastructure needs (storm, sanitary, road).
- 2022 reconstruction projects were largely completed as per the 2022 Engineering/Storm/Sanitary/Water Capital Forecast
- The Region replaces some Kitchener infrastructure as part of their projects (Kitchener funded and some may be water-only projects).
- 2024 projects were finalized; however, it should be noted that there were a number of Regional projects moved out to future years in the Regional capital program.

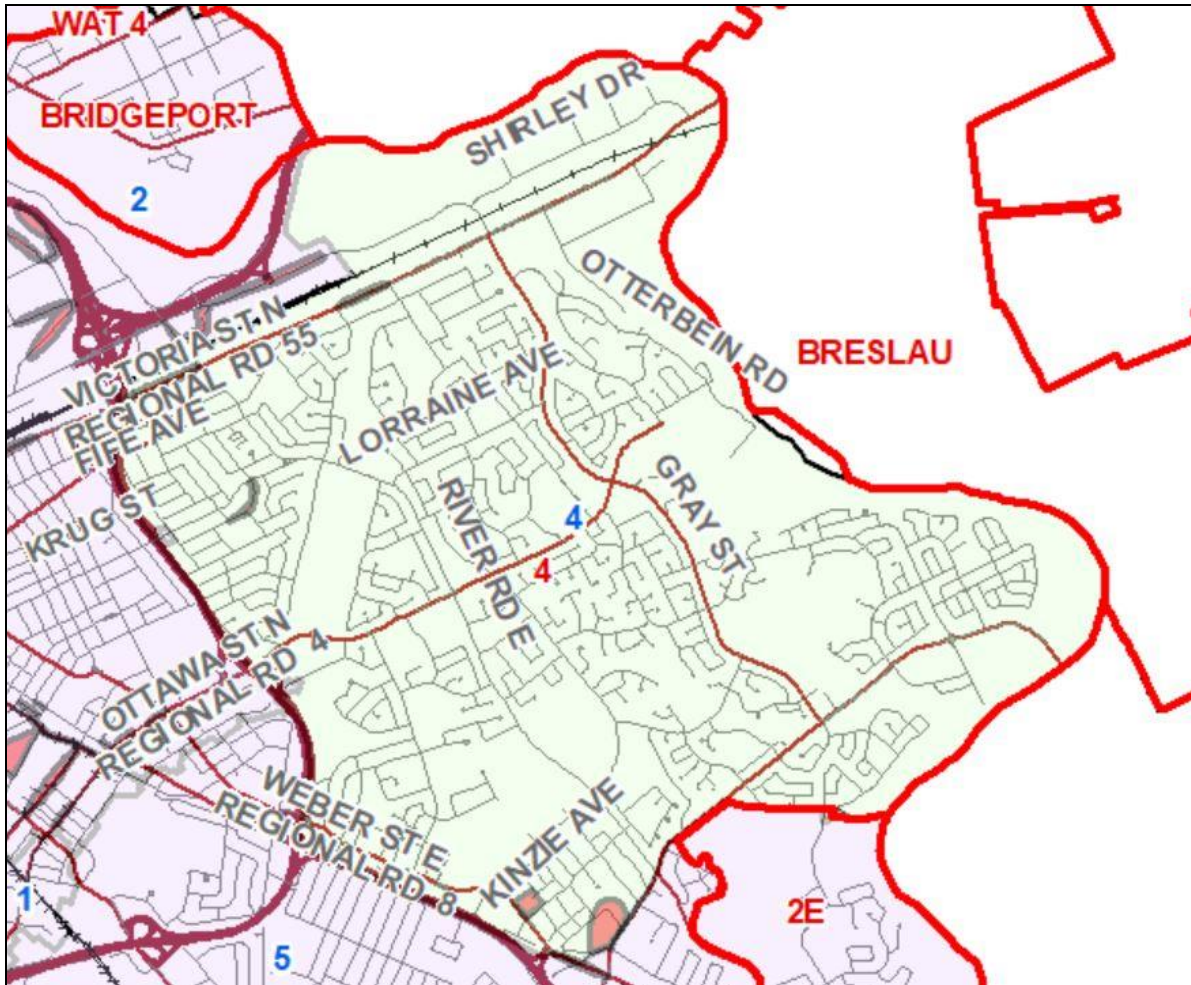
- Meetings were held with Asset Management and Engineering staff at both the City and the Region to determine future project needs.
- Issue papers are brought forward as part of the budget process, additional funding requests related to maintenance and water-only capital projects. The majority of water-only projects are included as part of Regional roadwork to minimize disruptions to citizens and be cost effective.

Action: No further action required – for information only

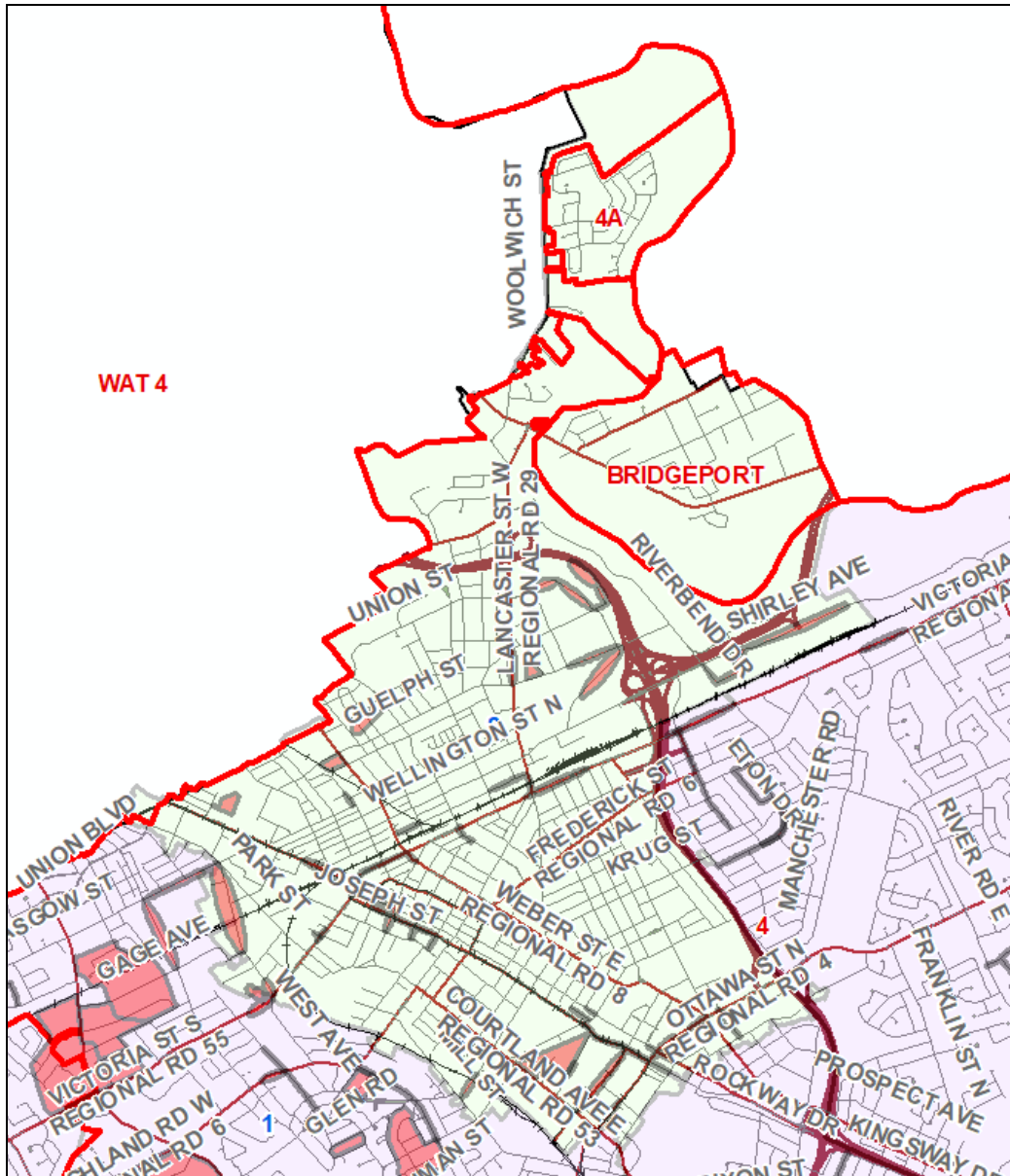
Summary of Maintenance

- Watermain cleaning – Approximately 151kms of watermain was cleaned in 2023. The 2023 watermain cleaning area map is shown below. The next map shows the proposed 2024 area in pink/red. The 2023 area was previously cleaned in 2017 thus re-starting the 6-year cleaning cycle. The purpose of watermain cleaning is to remove iron and manganese build up in the watermains. The iron and manganese cause discolouration in the water. Although iron and manganese are naturally occurring and not health related, discoloured water causes a public perception of issues with the drinking water. Provincial health related regulations are anticipated for iron and manganese.

Completed 2023 Watermain Cleaning Area (light green)



Proposed 2024 Watermain Cleaning Area (light green)



- Hydrant maintenance – spring maintenance was completed on all hydrants and all hydrants were dipped in the fall.
- Hydrants are flushed to maintain chlorine residuals was completed in spring and fall.
- New development areas are flushed monthly until the subdivision is built-up.
- A valve turning/exercising program was completed for 1,395 valves – the majority of valves were operated in the watermain cleaning area with additional valve operation in areas of

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reconstruction. Critical valves along the LRT were also operated. Operating valves ensures that they will work when they are needed in an emergency or for construction activities.

- There were 19 broken valves and/or failing valves were either replaced or removed which allows for quicker isolation for water emergencies. Broken valves are tracked in real time and the majority are addressed within weeks (except for winter). At the end of 2023 there were 9 broken valves remaining, 7 of which will be replaced as part of future reconstruction work.
- 350 hydrants were painted.
- Leak detection survey – a third of city completed each year. Follow-up is completed on potential leaks. Approximately 330km of mains were surveyed resulting in two possible watermain leaks and six possible hydrant leaks – the majority of they hydrant leaks were repaired by tightening the nuts of the hydrants. Staff were unable to pinpoint the two potential watermain leaks and are continuing to monitor.
- Staff continue to inspect new connections and cut and caps for reconstruction and new development. Staff complete all new service tappings for development as well as witness old service abandonment. This work requires 48 hours to schedule and is driven by new development and watermain replacement work.
- Anodes are installed on existing watermains whenever they are exposed (e.g., watermain breaks, valve repairs, hydrant repairs).
- Pressure Reducing Valves (PRVs) were inspected.
- Chamber inspections/pump outs for chambers containing air relief valves – approximately 120. Air reliefs are a potential risk to the system if they become submerged and there is a watermain break or incident in the distribution system. Two boulevard style air reliefs were installed in 2024 to replace existing air reliefs in chambers.
- Staff continue to use the watermain break app for reporting breaks and water service leaks, which improves customer communication for breaks. Additional functionality to the watermain break app has been added.
- Approximately 20% of the city’s water mapping has been QA/QC’d resulting in dozens of missing water valves being added as well as corrections to services and chambers. Once added to the maps, the assets can be maintained. This work will continue over the next few years until the entire city has been reviewed. There are new processes to trigger a review of the specific mapping areas when it has been either replaced or newly added.

Action: No further action required – for information only

Effectiveness of Maintenance

Completion of numerous maintenance programs associated with the water and the infrastructure are essential for the delivery of safe drinking water, although not all maintenance programs have been identified. The effectiveness of the maintenance program is determined by the following key factors:

- Number of Adverse Water Quality Incidents
- Water loss/unaccounted for water
- Water quality complaints
- Number of watermain breaks

The system performance has demonstrated effectiveness by achieving:

- There were 20 AWQIs (an indication of water quality).
- Water loss/unaccounted for water was 9.9% (at the target of 10%).
- The number of quality complaints was at 97, 20% of which were related to discoloured water and 27% pressure (largely internal issues). The remainder included complaints relating to hard water (new residents are not always familiar with hard water), and general safety concerns. The watermain cleaning program has decreased the number of complaints.
- There were 44 watermain breaks in 2023, which is a lower than the 5-year average of 74 breaks/year.

Action: No further action required – for information only

Operational Plan Currency, Content and Updates

- The Operational Plan is updated annually.

Action: No further action required – for information only

Staff Suggestions

Staff suggestions are included under the new Continual Improvement section of the report.

Other

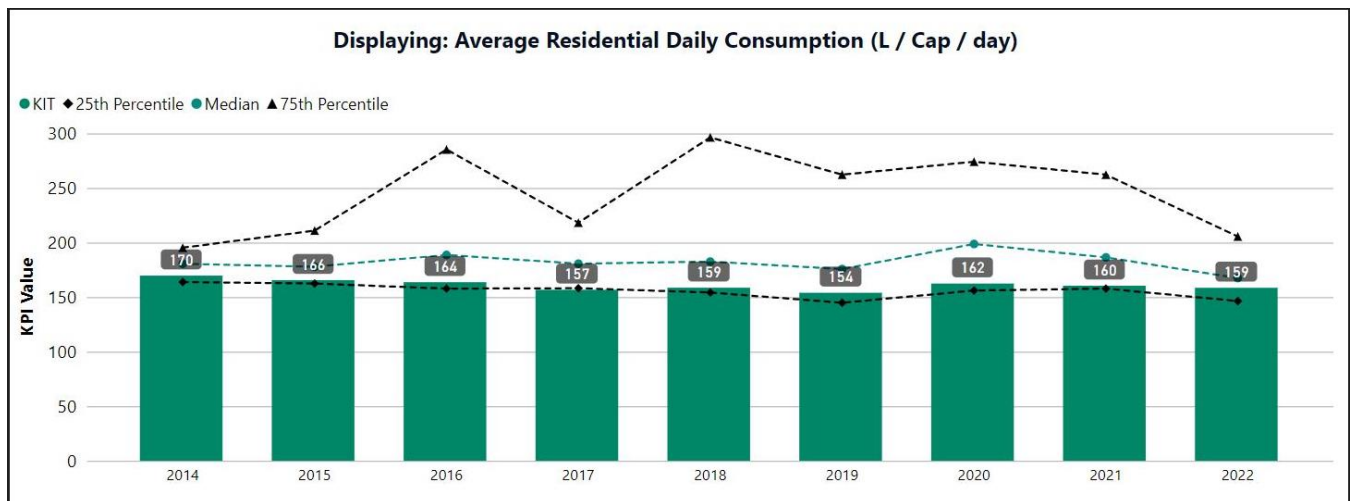
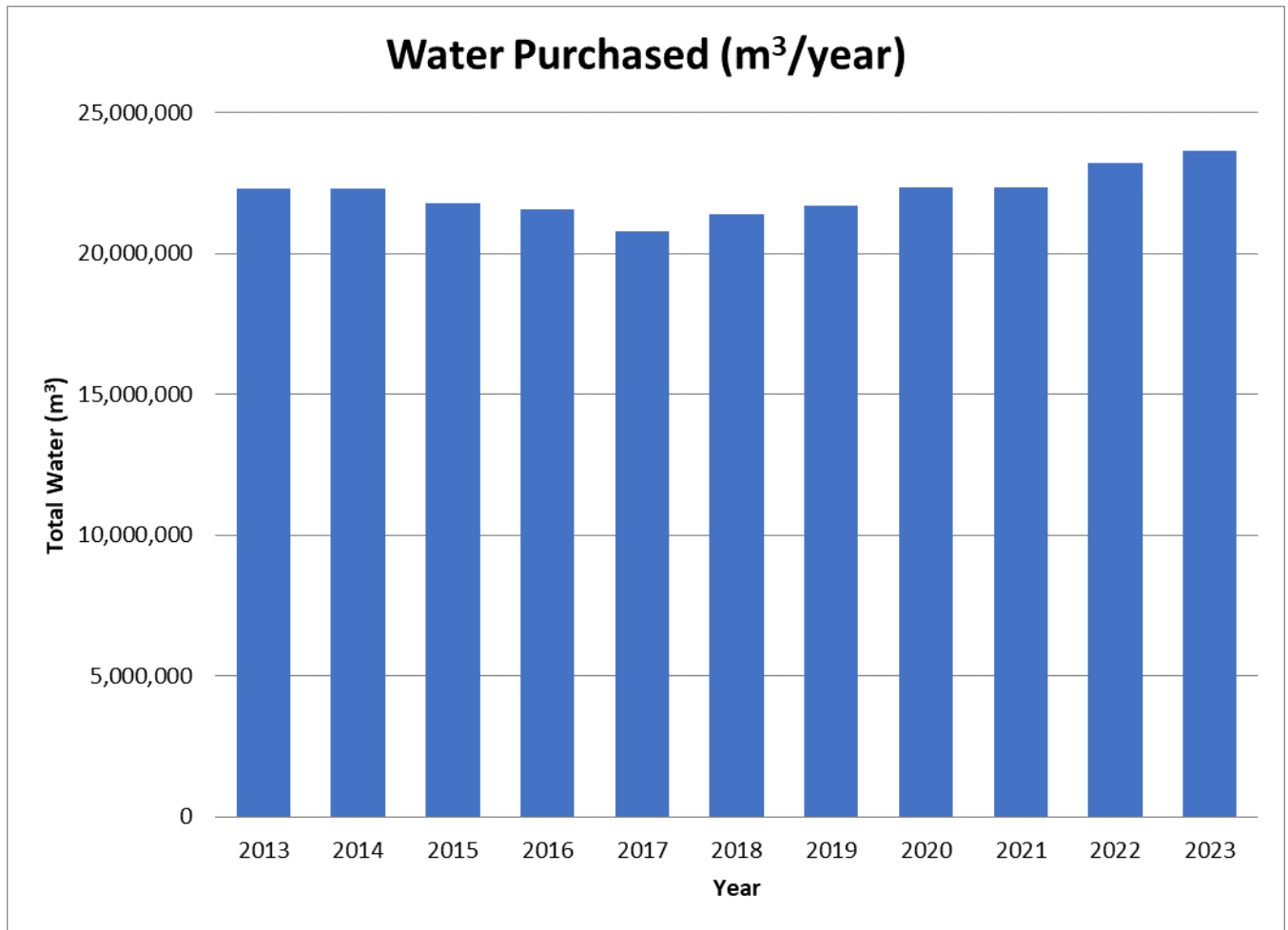
- Water Meter Replacement – 600 aging/problem water meters were replaced. Approximately 1,850 service orders generated (e.g. remotes not working, potential stopped meters, new large meter inspections, removals, leaking meters, etc.). There are 71,653 meters in the system. A large scale meter replacement program was paused in 2023 pending the direction of AMI as part of the WIP. Meter replacement will proceed to 2022 levels in 2024.

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- The Cross Connection program moved to AMANDA which will allow for better reporting and tracking of devices. On-line payment for Building Permits provides makes it easier for customers to obtain permits for backflow devices.
- Development growth is anticipated to continue with both new subdivision, site plans and redevelopment, which creates technical demands for Drinking Water Works Permit approvals, commissioning plan approvals and on-demand inspection requirements for final connections, tappings and cut and caps.
- Water Consumption Trends – water consumption has increased since 2018 as population growth demands increase. Average residential daily consumption values were decreasing prior to the pandemic but increased in 2020. The 2021 and 2022 values decreased slightly; however 2023 benchmarking values are not yet available. Kitchener average residential daily consumption levels are lower than many comparison municipalities (around the 25th percentile).
- Development of additional dashboards including lead sampling, watermain material and watermain break costs.

The Region of Waterloo is progressing on an update to their Water Supply Strategy, to look at current water supply sources, assessing future water demands and investigating possible new water sources. The Strategy will develop and evaluate recommendations to meet future water supply needs in Waterloo Region to 2051. The Water Supply Strategy will build on previous master plans, and will look at:

- Current sustainable water supply sources and water demands.
- Population growth and how it impacts future water demands.
- The gap between today's water supply and tomorrow's needs and resourcing that gap in a sustainable, efficient way.
- The effect of climate change on our water supply resources.



City of Kitchener Water Distribution

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- Locates - Kitchener Utilities and their Locate Service Provider physically locate gas and water infrastructure for contractors prior to construction and excavation work. Approximately 14,284 locates completed from January to November; December values are not yet. Locate volumes are driven by customer requests and construction.

Action: No further action required – for information only

Appendix

Water Distribution System Map

