Utilities Kingston
Report to Council
Report Number 25-072

To:	**Mayor and Members of Council**
From:	**David Fell, President & CEO, Utilities Kingston**
Resource Staff:	**Heather Roberts, Director, Water and Wastewater**
Date of Meeting:	**February 18, 2025**
Subject:	**2024 Water System Annual Summary Reports and 2024 Wastewater Annual Reports**

Council Strategic Plan Alignment:

Theme: Regulatory & compliance

Executive Summary:

This report provides Council with copies of the Annual Water Summary Reports and Annual Wastewater Reports for the following Water and Wastewater Treatment Facilities and Systems owned by the City of Kingston, and managed, operated, and maintained by Utilities Kingston:

- King Street Water Treatment Plant
- Point Pleasant Water Treatment Plant
- Cana Water Treatment Plant
- Ravensview Wastewater Treatment Plant
- Cataraqui Bay Wastewater Treatment Plant
- Cana Wastewater Treatment Plant
- Kingston Wastewater Collection System

It is a requirement of the Safe Drinking Water Act, 2002 that Council formally receive the Annual Summary Reports for each of the Water Treatment Facilities. The Annual Reports for the Wastewater Treatment Facilities and System are provided for information purposes to Council and require no action. All reports are provided to the Ministry of the Environment, Conservation and Parks.

Recommendation:

That Council receive the 2024 Annual Water Summary Reports for the King Street Water Treatment Plant, the Point Pleasant Water Treatment Plant and the Cana Water Treatment Plant as required by the terms and conditions outlined in Schedule 22 of Ontario Regulation 170/03 for Drinking Water Systems.

Authorizing Signatures:

ORIGINAL SIGNED BY PRESIDENT

& CEO, UTILITIES KINGSTON

David Fell, President & CEO, Utilities Kingston

ORIGINAL SIGNED BY CHIEF

ADMINISTRATIVE OFFICER

Lanie Hurdle, Chief Administrative Officer

Consultation with the following Members of the Corporate Management Team:

Paige Agnew, Commissioner, Growth & Development Services	Not required
Jennifer Campbell, Commissioner, Community Services	Not required
Neil Carbone, Commissioner, Corporate & Emergency Services	Not required
Ian Semple, Acting Commissioner, Transportation & Infrastructure Services	Not required
Desirée Kennedy, Chief Financial Officer & City Treasurer	Not required

Options/Discussion:

Annual Water Summary Reports

The Annual Water Summary Reports are a statement to satisfy compliance with the terms and conditions of Schedule 22 of Ontario Regulation 170/03 for Drinking Water Systems. There is a compliance report for each water treatment plant. The purpose of this covering report is to provide details related to compliance with the Drinking Water Works Permit (DWWP) and the Municipal Drinking Water License (MDWL). These reports are Exhibits A, B and C, attached to this covering report.

The terms and conditions of the DWWP and MDWL are located under the “Compliance” section of the annual summary reports. The compliance section in each report summarizes the activities of the licensed water system operations as they relate to the water quality parameters outlined within the drinking water regulations.

The reports also summarize specific instances of non-compliance and adverse water quality during the 2024 reporting period which are summarized below.

King Street Water Treatment Plant

There were no instances of non-compliance with the terms and conditions of the Drinking Water Works Permit (DWWP) or the Municipal Drinking Water Licenses (MDWL) during the 2024 reporting year.

There were four (4) notifications of adverse water quality reported to the Spills Action Centre and to the Environmental Health Division of the local Ministry of Health during the 2024 reporting period.

1. An adverse water quality indicator notification was received from Caduceon Environmental Laboratories regarding a sample collected on **February 14, 2024,** which was determined to have a Total Coliform (TC) count of **1 cfu/100mL**. The free chlorine residual at the time of sampling was **1.47 mg/L**. Notifications were made to the Spills Action Centre and to the Environmental Health Division of the local Ministry of Health. Resamples were collected from the same location, upstream and downstream, and sent to the lab for analysis. With the free chlorine residual present in the original sample and the subsequent re-samples not indicating any adverse conditions, a contaminated sample bottle or sampling error is suspected.
2. Notification of a potential adverse water quality incident was provided to the Medical Officer of Health and Spills Action Centre on **April 29, 2024,** due to an equipment malfunction which resulted in a failure to provide chemically assisted filtration to the affected filter, while water was being directed to the next step of the treatment process. No advisory was issued by the Medical Officer of Health as plant performance data and bacteriological sampling result indicated there was no risk to public health.
3. Notification of a potential adverse water quality incident was provided to the Medical Officer of Health and Spills Action Centre on **July 7, 2024**, when a water main break

resulted in a loss of pressure for part of the distribution system. A boil water advisory was implemented for the affected area until two sets of bacteriological samples were tested and clear of E.coli and TC. A total of 22 samples were collected and the boil water advisory was lifted on **July 13, 2024.**

4. An adverse water quality indicator notification was received from Caduceon Environmental Laboratories regarding a sample collected on **September 26, 2024,** which was determined to have a TC count of 6 cfu/100mL. The free chlorine residual at the time of sampling was **1.83 mg/L**. Notifications were made to the Spills Action Centre and to the Environmental Health Division of the local Ministry of Health. Resamples were collected from the same location, upstream and downstream, and sent to the lab for analysis. With the free chlorine residual present in the original sample and the subsequent re-samples not indicating any adverse conditions, a contaminated sample bottle or sampling error is suspected.

For context and comparison with the free chlorine residuals noted at the time of the events listed above, a free chlorine level lower than 0.05 mg/L must be reported and corrective action taken.

It should be noted that the Kingston Drinking Water System receives water from both the King Street WTP and the Point Pleasant WTP. The drinking water distribution system is included in the DWWP and MDWL issued for the King Street Water Treatment Plant, as such, the boil water advisory issued in July 2024 for the Westbrook area is being reported in the King Street WTP summary report.

Point Pleasant Water Treatment Plant

There were no instances of non-compliance with the terms and conditions of the DWWP or the MDWL during the 2024 reporting period, or any adverse sampling results that required notification.

Cana Water Treatment and Supply System

There were no instances of non-compliance with the terms and conditions of the Drinking Water Works Permit (DWWP) or the Municipal Drinking Water Licenses (MDWL) during the 2024 reporting year.

There was one (1) notification of adverse water quality reported to the Spills Action Centre and to the Environmental Health Division of the local Ministry of Health during the 2024 reporting period.

1. An adverse water quality indicator notification was provided to the Medical Officer of Health and Spills Action Centre on **June 23, 2024,** due to a power disruption resulting in a loss of pressure in the distribution system. As directed by the Medical Officer of Health, a boil water advisory was issued to the residents serviced by the system. Two sets of bacteriological samples were collected and tested for E. coli and TC. Upon receipt of clear test results, the boil water advisory was rescinded on **June 26, 2024.**

In addition, it should be noted that the groundwater supply for the Cana Water Treatment Plant contains a sodium concentration greater than 20 mg/L which requires a notification to the Medical Officer of Health and to the Spills Action Center if a report under subsection 18 (1) of the Safe Drinking Water Act has not been made in respect of sodium in the preceding 57 months. This notification was last completed in July of 2022.

Wastewater Annual Reports

Annual reports for the wastewater facilities and system are a requirement identified in the terms and conditions of the environmental approvals for each treatment facility and the wastewater collection system. The annual reports are required to be submitted to the Ministry of the Environment, Conservation and Parks (MECP) by March 31, 2025. Although the regulation does not compel the Operating Authority to provide the reports to Council to be formally received, Utilities Kingston provides them annually for information purposes. The reports provide a summary of the operations for the previous year at Ravensview, Cataraqui Bay and Cana Wastewater Treatment Plants, and for the Kingston Wastewater Collection System.

Ravensview Wastewater Treatment Plant

In 2024, the Ravensview WWTP was in compliance with all of the conditions outlined in Condition 7 of the Environmental Compliance Approval (ECA) issued for the plant.

Ravensview WWTP did not exceed any of the limits set out in the ECA throughout the calendar year. However, the plant did exceed some of the objectives in the ECA. There were four samples throughout the year where plant effluent was below the pH objective of 6.50. In the month of November, the monthly average effluent Total Suspended Solids (TSS) exceeded the objective of 15 mg/l. The annual average Final Effluent results are available in Tables 5 and 6 in Exhibit D.

Average flows through the plant were recorded at 52,292 m^3/day, lower than the 2023 flows recorded at 61,303 m^3/day.

There were no secondary bypass events during 2024.

In the 2024 reporting year, the Ravensview WWTP received four complaints regarding odours from the facility. Influent flows into the facility were quite low and more concentrated during the late summer and fall seasons. During this time the facility received all four of the odour complaints. Efforts were made to clean tanks, and ensure all equipment was operating properly to help reduce odours.

Cataraqui Bay Wastewater Treatment Plant

In November 2024, there was one non-compliant condition reported. The average monthly concentration total for Total Ammonia Nitrogen was 14.79 mg/L, exceeding the limit of 8.0 mg/L. This non-compliant result was reported to the MECP. No actions or directives were provided by the MECP. The non-compliant result is a result of a significant release of an unknown substance

in the collection system that was extremely alkaline. This release led to a reduced capacity to biologically treat the wastewater coming into the plant. Operations staff brought the plant back up to full treatment capacity, and by early December nitrification (a biological process that converts ammonia into nitrate) was back to normal. This incident also led to several monthly average concentrations of Biochemical Oxygen Demand, and Total Suspended Solids, and an effluent pH reading, being higher than the objectives set out in the ECA. The source of the release remains unknown. The 2024 monthly average effluent monitoring results can be found on Tables 4 and 5 in Exhibit E.

No other parameters exceeded the compliance limit as outlined in the ECA, however, in February 2024, the monthly average Effluent Total Phosphorous concentration was above the objective while remaining below the limit.

No other parameters were above objective limits as outlined in the ECA.

Average flows through the plant were recorded at 25,890 m^3/day, lower than the 2023 flows recorded at 28,740 m^3/day.

There were no secondary bypass events during 2024.

There were three spill events of un-combusted digester gas to the environment, totaling 853 m^3 that were reported to the MECP in the 2024 reporting year. These spills occurred when the pilot light of the flare stack blew out in high winds. The primary boilers use digester gas to heat the facility, and any excess digester gas is sent to the flare stack. During these periods where the flare was not lit, any digester gas being sent to the flare was not burnt off. The release of unburnt digester gas is considered a spill to the environment. Contractors were hired to assess the flare stack and make adjustments to strengthen the pilot flame. This stronger pilot flame, coupled with modifications to operating procedures, are expected to reduce the frequency of these spills due to the pilot light being blown out.

In the 2024 reporting year, the Cataraqui Bay WWTP received no official complaints regarding the facility or treatment process.

Cana Wastewater Treatment Plant

In December 2024, there was one non-compliant condition reported. The average monthly concentration for Total Suspended Solids was 0.11 mg/L, this exceeded the limit of 0.10 mg/L. Utilities Kingston responded and resolved the exceedance quickly and the plant effluent is well below limits.

In addition, there were several months where the Total Suspended Solids, and Total Phosphorous exceeded the monthly objectives, but were below the compliance limit.

No other parameters were above compliance or objective limits as outlined in the ECA.

Average flows through the plant were recorded at 57.7 m^3/day, lower than the 2023 flows recorded at 62.7 m^3/day.

There were no bypass events during 2024.

In the 2024 reporting year, the Cana WWTP received no complaints regarding the facility or treatment process.

Kingston Wastewater Collection System

In 2024, the west collection system collected and conveyed 9,968,779.5 m^3 of wastewater to the Cataraqui Bay WWTP. The Central and East Collection system collected and conveyed 19,128,065 m^3 of wastewater to the Ravensview WWTP. The Cana Collection system received and conveyed 20,998 m^3 of wastewater to the Cana WWTP.

The collection system had several wet weather overflow events which released a total of 913.33 m^3 of sewage to the environment, considerably less than the 6,134.82 m^3 reported for 2023. The collection system had two spills to the environment from a pumping station due to equipment malfunctions and from a collection system break totaling 46 m^3, considerably less than the 904.4 m^3 reported for 2023. The overflow and spill locations are provided in Exhibit G. The number of wet weather overflow events and volume of diluted sewage released to the environment in 2024 was less than the number of events and volume reported in 2023. This is due to less severe wet weather events, and sewer separation projects.

In the 2024 reporting year, several complaints were received, investigated, and resolved.

There were 14 odour complaints connected to the new Days Road Pumping Station. Utilities Kingston operations staff investigated the complaints and inspected the odour control unit at the facility regularly to ensure it was functioning and being properly maintained. The media in the odour control unit was replaced during the year, and modifications to the odour control system have been made to attempt to reduce the amount of odour escaping the station. Utilities Kingston utilized the contractor and engineering firm hired to construct the station design and implement possible solutions.

There were an additional 14 odour complaints, regarding the collection system. These complaints include sewage odours noted in residences and businesses. Staff responded and investigated all of these complaints. Responses to these complaints included inspecting infrastructure upstream and downstream of the complaint, installing devices in manholes to reduce the chance of sewer gasses being released, jetting and cleaning pipes, inspecting lines with a camera, some visits to residences and businesses, and sewage sampling.

Staff responded to 127 complaints about lateral and main collection system backups. Operations staff worked with property owners and tenants at each site to locate and confirm the source of the backup. The majority of the sewer backups were caused by non-flushable materials, tree root growth, or deformed or degraded pipes. 71 of the 127 complaints were related to private infrastructure (i.e., the homeowner or business owner’s sewer lateral on their

property). Staff worked to relieve these backups using different methods. Crews rodded lines, performed camera work to identify and locate the issue, used jet trucks to clear blockages to return the collection system to good working order. Operators also proactively flush known problem sewers, in order to maintain the integrity of the collection system.

Public Engagement

In accordance with Schedule 22 of Ontario Regulation 170/03 for Drinking Water Systems, the 2024 annual drinking water quality reports will be available and posted to the Utilities Kingston website. For example, and reference, the 2023 annual drinking water reports can be viewed here. Appropriate public notice will be provided in the form of a public news release and on social media. Reports are also available in hard copy at the request of a member of the public.

The Annual Wastewater Reports will be available and posted to the Utilities Kingston website. For example, and reference, the 2023 annual reports can be viewed here.

Existing Policy/By-Law

The Annual Water Summary Reports are a statement to satisfy compliance with the terms and conditions of Schedule 22 of Ontario Regulation 170/03 for Drinking Water Systems, a regulation under the Safe Drinking Water Act, 2002.

As per the Environmental Compliance Approvals, the Annual Reports for the Wastewater Facilities and System are required to be submitted to the MECP by March 31 of each year.

Notice Provisions

Notice to the public on the completion and availability of the annual drinking water reports is required and will be provided by the end of February.

Financial Considerations

None.

Contacts:

Heather Roberts, Director, Water and Wastewater Services, 613-546-1181 extension 2400

Other City of Kingston Staff Consulted:

Phil Emon, Manager, Water and Wastewater Treatment Operations

James Patenaude, Supervisor, Water and Wastewater Treatment Operations

Exhibits Attached:

Exhibit A – King Street Water Treatment Plant, Annual Summary Report 2024

Exhibit B – Point Pleasant Water Treatment Plant, Annual Summary Report 2024

Exhibit C – Cana Water Treatment Plant, Annual Summary Report 2024

Exhibit D – Ravensview Wastewater Treatment Plant, Annual Report 2024

Exhibit E – Cataraqui Bay Wastewater Treatment Plant, Annual Report 2024

Exhibit F – Cana Wastewater Treatment Plant, Annual Report 2024

Exhibit G – Kingston Wastewater Collection System, Annual Report 2024

KING STREET WATER TREATMENT PLANT

2024 ANNUAL SUMMARY REPORT

Drinking Water System Number: 220001860
Drinking Water System Owner: City of Kingston
Drinking Water System Category: Large Municipal Residential

Submitted by:
David Fell
President & C.E.O.

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1 INTRODUCTION

This report has been prepared as required under Ontario Regulation 170/03 of the Safe Drinking Water Act (SDWA) to acknowledge compliance with the terms and conditions of the Drinking Water Works Permit (DWWP) and Municipal Drinking Water License (MDWL) issued for the King Street Water Treatment Plant, comment on any incidents of non-compliance during the reporting period, summarize the quantities of the water supplied, and compare those quantities to the rated capacity and flow rates as set out in the system's permit and MDWL during the reporting period.

This report is specific to the King Street Water Treatment Plant located at 302 King Street West, in the City of Kingston and its associated distribution system, which serves Kingston's municipal water customers in the areas North to Cataraqui Arena, Hwy #2 west to Westbrook, Bath Road to Coronation Blvd, south of Hwy #401, Hwy #2 east to Milton subdivision, and Hwy #15 north to the St. Lawrence Business Park known as the Kingston Drinking Water System.

The Kingston Drinking Water System receives water from both the King Street Water Treatment Plant and the Point Pleasant Water Treatment Plant. The Water Treatment Plants and its associated distribution system are owned by the City of Kingston, with Utilities Kingston acting as the operating authority.

2 NON COMPLIANCE

There were no issues of non-compliance with the terms and conditions of the DWWP or MDWL during this reporting period.

3 COMPLIANCE

The Treatment Operations department of Utilities Kingston, for the City of Kingston, operates and maintains the King Street Water Treatment Plant (WTP) and complies with the terms and conditions of the DWWP and MDWL issued for the WTP. The Utilities Kingston Systems Operations department and the Treatment Operations department of Utilities Kingston operate and maintain the associated distribution system and storage and pumping facilities. Staffing is maintained at levels to ensure adequate numbers of trained and licensed personnel are available for proper operations during emergency or upset conditions, vacation/sick relief, or to deal with equipment breakdown.

Quality Management Systems (QMS), response plans, and operations manuals are established and are located in the appropriate facilities and available to appropriate staff.

A QMS for the City of Kingston's drinking water supply systems has been developed and implemented by Utilities Kingston management and staff to ensure the continued safety and security of the community's drinking water by meeting or exceeding the requirements of all relevant legislation and regulations, and the Drinking Water Quality Management Standard (DWQMS).

Operations manuals include information necessary for the day-to-day operations and maintenance of the WTP and distribution system as well as information that may not be regularly used but that might be required to be accessed quickly for various purposes. Response plans include information that may be required for proper operation of the WTP or distribution system during emergency or upset conditions and contain items such as emergency plans and contact lists, alternate materials supply sources, and notification lists.

The operations strategy of Utilities Kingston includes ensuring that permits, approvals, and licenses are in place, that efficient maintenance and operations ensures the quality of water supplied to its customers meets or exceeds the minimum requirements as set out in the SDWA, and that permissible flow rates are not exceeded. The City of Kingston, as a means of source water protection, considers the impact of decisions made within its authority on the drinking water supply source for the WTP.

Flow measuring devices for measuring the amount of water taken from Lake Ontario, and the amount of water supplied to the distribution system are calibrated annually by a third party. Accuracy in these measurements ensures that treatment chemicals are precisely applied and that flows do not exceed the capacity at which the WTP is designed to be effective. These flows are recorded to provide current and historical information which is used for operational decision making and to allow both the public and the Ministry of the Environment, Conservation and Parks (MECP) the ability to review WTP operations.

Water quality analyzers that monitor parameters such as chlorine residual and turbidity of critical process streams and water directed to the distribution system are alarm equipped and are maintained in accordance with the manufacturer's recommendations as well as the conditions of the DWWP/MDWL.

Water sampling is conducted to a level that exceeds the minimum requirements of schedule 13 of Ontario Regulation 170/03 of the Safe Drinking Water Act, and includes additional sampling as well as sampling recommended in the first Engineers Report for the WTP. Raw water sampling is conducted to give operational staff information required to determine the level of treatment required to make the water potable. In-plant process stream samples provide monitoring of treatment processes. Treated and distribution system sampling provides information regarding the quality of water delivered to customers. All of these samples are analyzed by either licensed staff or by laboratories accredited by the Standards Council of Canada through the Canadian Association for Environmental Analytical Laboratories.

All sampling information, annual reports and all other documentation required by the DWWP, and regulations are available for public viewing at the WTP during normal business hours. Annual Reports are also available on the Utilities Kingston website as well as at the Utilities Kingston and City of Kingston offices. Residents of the City of Kingston are encouraged to review this information, the availability of which is advertised through various local media.

4 NOTIFICATIONS

Under Ontario Regulation 170/03, notifications were required for any instances where a sample result indicated that a parameter used to measure water quality exceeded a Maximum Acceptable Concentration (MAC). Once a notification is received from a laboratory or an observation of any other indicator of adverse water quality is made by operations personnel, corrective action as dictated by the regulations is initiated in an effort to confirm the initial result. If confirmed, further action may be recommended by the Medical Officer of Health. If not confirmed, sampling will typically return to the normal schedule, or depending on the parameter, Utilities Kingston may choose to increase the sampling frequency to monitor the parameter more closely for a period of time.

4.1 EVENTS REQUIRING NOTIFICATIONS

- An adverse water quality indicator notification was received from Caduceon Environmental Laboratories regarding a sample collected on **February 14th**, which was determined to have a Total Coliform (TC) count of **1 cfu/100mL**. The free chlorine residual at the time of sampling was **1.47 mg/L**. Notifications were made to the Spills Action Centre and to the Environmental Health Division of the local Ministry of Health. Resamples were collected from the same location, upstream and downstream, and sent to the lab for analysis. With the free chlorine residual present in the original sample and the subsequent re-samples not indicating any adverse conditions, a contaminated sample bottle or sampling error is suspected.
- Notification of a potential adverse water quality incident was provided to the Medical Officer of Health and Spills Action Centre on **April 29th**, due to an equipment malfunction which

resulted in a failure to provide chemically assisted filtration to the affected filter, while water was being directed to the next step of the treatment process. No advisory was issued by the Medical Officer of Health as plant performance data and bacteriological sampling result indicated there was no risk to public health.

- Notification of a potential adverse water quality incident was provided to the Medical Officer of Health and Spills Action Centre on **July 7th**, when a water main break resulted in a loss of pressure for part of the distribution system. Residents experienced a loss of pressure while repairs were being completed. A boil water advisory was implemented for the affected area until two sets of bacteriological samples were tested and clear of E.coli and TC. A total of 22 samples were collected and the boil water advisory was lifted on **July 136th**.
- An adverse water quality indicator notification was received from Caduceon Environmental Laboratories regarding a sample collected on **September 26th**, which was determined to have a TC count of 6 cfu/100mL. The free chlorine residual at the time of sampling was **1.83 mg/L**. Notifications were made to the Spills Action Centre and to the Environmental Health Division of the local Ministry of Health. Resamples were collected from the same location, upstream and downstream, and sent to the lab for analysis. With the free chlorine residual present in the original sample and the subsequent re-samples not indicating any adverse conditions, a contaminated sample bottle or sampling error is suspected.

5 QUANTITY OF WATER SUPPLIED

Listed in Tables 3 and 4 following this report are the treated water flows for the King Street Water Treatment Plant. The serviced population for the King Street WTP and Point Pleasant WTP is 132,485 (population from Census data for 2021). The annual average daily use was 19,229 m^3/day from Point Pleasant WTP and 45,820 m^3/day from King Street WTP. Total average per capita use was calculated at 490 litres per person/day. The metered residential use for 2024 is currently pending. The typical Canadian average is 250-350 litres per person/day residential use (source: Environment Canada). The City has imposed limitations or restrictions on water use when necessary. System losses through leakage, mainly due to the age of the distribution system infrastructure, also account for a significant portion of the “unaccounted for” water. Water systems operators perform proactive leak detection throughout the year and perform reactive leak detection based on reports of high water demand.

6 FLOW RATE EXCEEDANCES

There were no instances during this reporting period where flows at the King St WTP exceeded the maximum allowable flow rate of 118,000 m^3/day. Listed in Tables 1 and 2 following this report are the raw water flows (water taken from Lake Ontario) for the King Street Water Treatment Plant.

7 TREATMENT CHEMICALS USED

There are two treatment chemicals in use at this treatment plant. Chlorine, in the form of 12% sodium hypochlorite, is used as the disinfectant and Poly Aluminum Chloride (PACl) is used as the coagulant for the WTP.

Chlorine is dosed at the treatment plant at a rate which ensures an adequate residual is maintained at those points in the distribution system that are farthest from the point of entry of treated water to the system and, that an adequate chlorine Contact Time (CT) value is maintained for the rate of flow. The average chlorine dosage for this treatment plant is approximately 2.41 mg/L. Residuals are routinely measured in the distribution system, and the treatment plant chlorine dosage is adjusted as required to ensure the chlorine residual stays above the critical control limit of 0.20 mg/L. The

critical control limit is chosen to ensure operators have ample time to respond and correct issues before the chlorine residual reaches the regulatory limit of 0.05 mg/L.

PACl dosages for this treatment plant range from 4.17 – 16.27 mg/L. This dosage is also adjusted to ensure efficiency in the coagulation process as various changes occur in the raw water. Changes are based on things such as pH, temperature, turbidity, and the aluminum residual in the treated water.

Chlorine is also added to the water as it passes through the James Street Booster Station. The booster station is located in Barriefield village, and pumps water from the distribution system at the west of the Cataraqui River into the distribution system located east of the Cataraqui River. Chlorine is added here to slightly raise the level of chlorine to ensure adequate residual remains in the water in this part of the distribution system.

8 SUMMARY

The King Street Water Treatment Plant supplied water to residents of Kingston at flow rates which allowed adequate treatment while not exceeding permitted flows. Water of good quality which is safe to drink was produced by the treatment plant during this reporting period.

Further information is available for this system and is included in the annual reports which can be accessed from the Utilities Kingston Website at http://www.utilitieskingston.com, Kingston City Hall, or the Utilities Kingston offices. For further information about this report or any questions regarding accessibility, contact Robert Cooney at rcooney@utilitieskingston.com, or call 613-546-1181 Ext 2291.

9 FLOWS

Raw, Treated, and Distribution flows are summarized in the following tables.

Table 1 – Raw Water Flow Daily Totals (m3)

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	45,600	52,200	52,300	52,400	48,000	49,100	46,900	52,658	45,608	48,670	52,030	41,170
2	45,300	52,600	52,800	52,700	50,100	45,900	52,100	53,025	46,253	51,688	46,505	42,250
3	45,500	52,400	53,200	52,600	47,700	50,500	50,800	53,115	44,399	46,669	45,177	41,778
4	45,000	52,500	52,500	52,600	43,600	48,400	47,000	53,394	47,607	43,095	49,832	41,824
5	44,200	52,800	52,600	52,300	44,000	46,700	50,000	48,858	48,809	42,664	45,325	41,820
6	45,400	53,000	52,700	52,300	44,000	52,400	51,800	46,879	42,728	43,463	45,301	41,638
7	45,800	51,600	52,400	52,800	44,100	47,800	51,800	46,995	44,707	49,375	45,387	41,725
8	47,000	45,000	52,600	52,500	44,000	45,700	46,400	45,526	48,849	51,926	51,676	44,073
9	48,200	52,300	47,600	55,000	47,500	45,600	46,400	45,175	45,217	51,475	51,671	50,652
10	52,500	52,900	50,300	48,200	48,000	45,500	47,506	45,111	42,490	52,490	46,592	50,781
11	51,900	53,000	52,700	52,400	48,000	45,600	46,743	45,585	43,383	51,776	44,939	45,308
12	52,200	52,700	53,100	52,500	47,900	45,300	52,157	43,334	43,089	51,976	44,991	44,171
13	48,000	52,000	52,770	50,400	48,200	45,800	52,837	43,905	46,210	52,077	48,648	44,179
14	46,200	52,800	51,600	45,900	46,800	45,400	51,204	43,509	48,182	45,777	51,893	44,271
15	46,100	52,300	52,700	52,000	45,600	45,000	53,435	42,484	48,821	46,078	51,986	45,972
16	45,100	52,800	52,400	53,000	47,000	45,300	46,166	43,442	52,147	45,824	47,121	51,475
17	48,200	52,400	53,200	50,100	51,700	51,200	44,389	43,735	51,551	51,089	45,290	50,343
18	53,000	52,400	53,000	46,000	47,700	52,300	45,862	42,502	52,444	49,642	45,091	50,107
19	52,600	52,800	46,900	46,100	45,400	51,700	43,650	43,261	55,895	44,976	49,440	47,384
20	52,500	53,690	49,300	45,900	46,700	51,900	42,842	45,311	51,652	45,070	51,071	44,003
21	52,500	45,300	52,800	46,100	48,300	52,600	42,768	45,150	51,758	45,070	52,024	43,491
22	52,900	44,900	52,400	44,800	47,400	46,400	45,145	42,943	51,812	51,617	46,451	43,660
23	52,900	49,500	46,400	44,000	52,200	45,300	48,500	43,317	51,381	52,328	45,025	44,142
24	52,700	52,500	46,100	47,100	52,500	49,000	52,109	43,001	53,091	54,334	44,891	44,139
25	52,600	52,300	46,300	51,700	52,000	52,300	52,520	42,892	56,380	49,263	45,014	44,039
26	52,500	52,400	46,200	51,400	46,400	51,900	51,687	43,454	51,314	46,997	45,839	44,009
27	49,800	52,500	45,800	51,700	45,800	48,100	51,789	44,484	51,288	46,141	50,934	44,276
28	52,700	58,000	50,000	45,800	47,300	45,400	52,040	44,623	46,846	45,617	51,796	49,255
29	52,600	52,200	52,200	44,900	52,400	45,400	49,156	43,179	45,338	44,749	45,555	50,090
30	52,500	N/A	52,100	45,100	51,800	45,300	45,404	43,998	45,284	44,837	41,487	43,993
31	52,600	N/A	52,200	N/A	51,900	N/A	47,932	44,650	N/A	48,601	N/A	39,715
Total	1,536,600	1,503,790	1,579,170	1,490,300	1,484,000	1,438,800	1,509,041	1,409,495	1,454,533	1,495,354	1,428,982	1,395,733
Average	49,568	51,855	50,899	49,677	47,737	47,960	48,704	45,495	48,484	48,225	47,633	45,201
Min	44,200	44,900	45,800	44,000	43,600	45,000	42,768	42,484	42,490	42,664	41,487	41,170
Max	53,000	58,000	53,200	55,000	52,500	52,600	53,435	53,394	56,380	54,334	52,030	51,475

Permit To Take Water (m3/day)	118,000
Yearly Average (m3)	48,453
Yearly Min (m3)	41,170
Yearly Max (m3)	58,000

Table 2 – Peak Raw Water Flow Daily Totals (m3)

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	48,690	60,000	60,000	56,560	58,000	56,000	56,000	56,620	51,538	54,952	75,000	50,038
2	48,180	56,320	57,000	56,030	55,000	49,290	56,590	56,737	46,374	56,315	53,576	49,617
3	47,580	52,400	57,000	58,000	55,000	56,420	58,000	56,474	46,352	54,294	53,838	49,623
4	48,750	56,610	56,000	57,000	49,000	54,780	54,000	56,400	59,591	49,968	56,923	62,166
5	46,661	57,000	58,000	57,000	51,000	56,650	57,000	56,175	64,900	46,526	49,921	61,159
6	48,610	57,000	56,600	60,000	48,040	58,000	58,000	52,978	51,395	46,710	58,892	45,908
7	48,570	57,000	56,320	57,000	47,840	56,250	58,000	52,499	71,819	55,395	50,027	46,197
8	55,390	60,000	56,440	56,290	50,000	51,000	46,400	55,683	80,000	66,070	55,556	55,582
9	50,270	57,000	54,890	54,840	57,000	51,000	46,400	51,463	72,604	56,890	55,947	55,624
10	57,000	57,000	55,910	56,250	51,860	50,000	53,455	51,223	51,363	56,714	54,641	10,000
11	57,000	57,000	60,740	55,990	51,310	51,000	60,274	52,582	59,373	56,464	50,509	51,431
12	57,000	55,880	61,740	56,550	51,270	47,890	66,430	51,674	45,872	56,491	50,444	49,380
13	55,000	58,000	57,000	63,990	54,000	51,650	56,969	49,749	59,439	56,112	55,468	49,867
14	52,000	58,000	58,000	48,570	57,000	48,190	56,121	45,880	55,177	70,000	75,000	51,026
15	51,000	58,000	58,000	57,000	48,840	48,980	69,079	80,000	55,228	58,370	55,802	52,837
16	50,000	57,000	58,000	56,510	55,590	48,370	100,000	51,518	56,570	46,653	55,281	56,402
17	55,940	58,000	58,000	55,480	61,000	56,000	50,466	51,628	56,470	57,046	50,061	56,153
18	56,380	57,000	58,000	52,000	55,000	55,930	61,709	51,641	57,454	75,000	49,295	55,827
19	55,960	58,000	58,000	46,100	51,000	58,000	46,178	46,387	80,000	52,889	85,000	54,980
20	56,410	58,000	57,000	52,000	55,490	57,000	45,637	45,949	55,306	53,333	100,000	49,483
21	56,680	48,640	58,000	52,000	58,420	58,000	45,567	59,568	59,098	53,352	80,000	49,486
22	59,000	48,430	56,340	52,000	57,000	55,000	50,100	51,597	56,247	57,065	53,943	50,372
23	60,000	56,570	54,370	50,000	58,000	52,000	68,350	46,067	55,486	64,883	49,919	51,159
24	57,000	57,000	48,440	56,570	58,000	55,110	58,428	46,341	80,000	80,000	50,531	49,603
25	57,000	57,000	52,000	56,180	58,000	56,290	58,253	46,418	80,000	55,012	51,359	49,292
26	58,000	55,970	52,000	55,990	53,000	57,000	61,890	46,297	55,490	53,048	54,343	50,827
27	60,000	56,940	49,030	54,830	50,320	56,410	56,228	46,473	56,381	53,026	66,055	50,357
28	57,000	56,780	55,620	52,980	59,000	48,700	56,307	59,052	54,378	51,640	56,269	55,392
29	57,000	57,000	57,000	51,000	57,700	48,980	70,146	46,336	52,021	53,194	56,795	55,129
30	57,000	N/A	57,000	49,000	60,490	49,060	49,472	46,288	51,307	49,302	49,649	49,583
31	60,000	N/A	57,000	N/A	56,510	N/A	55,863	46,699	N/A	85,000	N/A	49,205
Monthly Max	60,000	60,000	61,740	63,990	61,000	58,000	100,000	80,000	80,000	85,000	100,000	62,166

Permit To Take Water (m3/day)	118,000
Yearly Max (m3)	100,000

Table 3 – Treated Water Flow Daily Totals (m3)

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	41,500	48,200	48,300	48,200	44,800	44,900	42,900	48,500	41,700	45,600	46,900	40,900
2	41,700	48,500	48,700	48,300	47,500	41,500	48,200	48,100	41,800	47,900	42,700	41,000
3	41,300	48,300	48,100	48,600	44,800	46,200	47,600	47,600	41,800	44,600	41,600	41,000
4	41,900	48,400	48,300	48,500	41,200	44,300	43,100	47,900	45,500	43,200	48,000	41,200
5	41,800	48,600	48,500	48,200	41,500	44,600	46,000	45,700	47,700	42,700	42,300	41,100
6	41,800	48,800	48,500	48,200	41,400	47,800	47,900	44,300	42,700	42,700	42,200	41,000
7	41,700	47,400	48,200	48,500	41,200	43,300	47,900	44,200	44,400	43,700	42,200	41,000
8	43,200	42,400	48,200	48,500	41,100	41,500	45,700	42,700	49,500	48,500	47,300	42,500
9	48,200	48,400	43,500	43,000	43,000	41,400	41,600	43,480	44,400	48,300	47,500	47,400
10	48,400	48,800	48,100	44,200	44,100	41,300	41,500	43,120	41,000	48,700	42,800	47,600
11	47,900	48,800	48,500	48,200	44,000	41,300	41,700	42,300	41,200	48,400	41,000	43,700
12	48,100	48,500	46,800	48,300	43,800	41,300	47,000	41,700	41,400	48,300	41,100	40,800
13	43,800	47,900	48,500	46,600	43,900	41,400	48,700	41,700	44,400	48,200	44,300	41,100
14	42,100	48,700	48,000	41,900	42,200	41,400	45,800	41,900	44,200	41,700	47,600	41,100
15	42,000	48,200	48,600	47,900	41,400	41,200	47,900	41,400	44,800	41,400	47,700	42,200
16	42,100	48,600	48,300	48,800	43,000	41,500	42,300	41,800	47,800	41,400	43,400	46,900
17	44,900	48,400	48,900	46,000	48,000	47,300	41,100	41,900	47,300	48,700	41,200	47,000
18	48,700	48,300	48,800	41,900	43,500	48,200	41,300	41,900	47,100	47,800	41,200	46,400
19	48,400	50,600	45,700	42,000	41,400	47,600	41,400	42,000	47,500	44,800	45,700	43,700
20	48,400	40,200	45,300	41,900	42,600	48,000	41,200	42,000	47,500	44,700	47,500	40,500
21	48,300	41,600	48,700	42,100	44,100	48,400	41,200	41,800	47,500	44,800	47,500	40,300
22	48,600	40,900	48,200	41,600	43,200	42,600	41,400	41,900	47,600	49,100	43,000	40,500
23	48,800	45,600	42,400	41,800	47,900	41,200	44,200	41,800	47,400	49,000	41,500	40,500
24	48,500	48,100	42,100	44,300	48,200	45,200	49,800	41,800	47,200	48,800	41,600	40,500
25	48,500	48,200	42,200	48,400	47,800	48,200	50,100	42,000	47,600	45,500	41,700	40,500
26	48,300	48,300	42,200	48,000	42,100	47,900	48,500	41,700	47,300	44,700	42,200	40,400
27	48,600	48,400	41,900	48,200	41,400	43,800	47,800	41,900	47,500	44,500	47,700	40,700
28	48,600	47,800	46,000	42,400	42,900	41,400	47,700	42,000	44,300	43,100	47,300	45,400
29	48,500	48,000	48,100	41,500	48,100	41,300	45,600	41,900	43,400	41,700	44,200	46,300
30	48,400	N/A	48,100	41,400	47,600	41,400	41,300	41,800	43,100	41,100	41,100	40,500
31	48,400	N/A	48,200	N/A	47,600	N/A	43,900	41,800	N/A	42,500	N/A	37,500
Total	1,421,400	1,372,900	1,453,900	1,367,400	1,365,300	1,317,400	1,392,300	1,334,600	1,356,600	1,406,100	1,322,000	1,311,200
Average	45,852	47,341	46,900	45,580	44,042	43,913	44,913	43,052	45,220	45,358	44,067	42,297
Min	41,300	40,200	41,900	41,400	41,100	41,200	41,100	41,400	41,000	41,100	41,000	37,500
Max	48,800	50,600	48,900	48,800	48,200	48,400	50,100	48,500	49,500	49,100	48,000	47,600

Municipal Drinking Water Licence Max (m3/day)	118,000
Yearly Average (m3)	44,878
Yearly Min (m3)	37,500
Yearly Max (m3)	50,600

Table 4 – Peak Treated Water Flow Daily Totals

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	42,710	50,750	50,720	50,630	50,170	48,850	49,720	50,180	42,620	48,680	48,860	41,650
2	42,610	50,020	50,750	50,140	50,240	42,810	49,880	50,090	43,050	49,180	47,200	41,860
3	45,290	50,360	50,410	58,660	50,120	49,800	57,680	49,060	42,590	47,370	50,750	42,030
4	42,980	50,350	51,010	59,540	42,650	49,480	48,450	49,680	51,970	44,610	50,990	41,890
5	42,880	51,040	50,630	51,090	42,650	50,610	50,170	49,100	52,070	43,640	43,070	41,990
6	42,870	51,000	53,200	50,730	42,700	49,640	50,610	45,020	43,330	43,720	43,830	41,800
7	42,920	50,770	50,280	51,140	42,360	48,490	49,800	45,440	50,550	50,390	42,940	41,470
8	49,810	50,630	50,410	50,530	42,700	42,420	50,570	44,370	51,500	50,500	49,140	48,330
9	50,580	50,740	49,000	48,190	45,070	42,530	42,950	42,500	50,900	50,240	49,130	48,980
10	50,770	51,000	50,660	50,420	45,340	42,720	42,620	42,750	42,030	50,490	48,290	48,830
11	50,880	50,900	51,120	50,310	44,920	42,560	49,350	43,120	42,360	49,640	41,470	48,350
12	50,850	50,450	51,220	50,610	44,940	42,470	49,390	42,620	42,470	49,390	41,670	43,830
13	49,560	50,840	50,001	50,130	45,510	42,330	49,590	42,570	48,550	49,190	48,380	41,800
14	43,020	50,520	52,070	43,100	45,150	42,320	49,060	42,450	48,960	49,320	49,070	41,790
15	43,030	56,560	51,060	50,770	42,210	42,280	50,860	42,160	49,130	42,330	49,010	45,990
16	43,000	50,860	51,120	50,670	49,510	48,030	47,810	42,550	49,630	42,630	48,720	48,280
17	49,630	50,570	51,020	49,300	50,500	50,410	42,260	42,630	67,090	50,380	42,850	52,620
18	50,400	50,350	51,110	51,320	49,040	49,970	44,490	42,610	48,720	50,230	42,560	48,440
19	50,070	51,110	50,000	43,010	42,610	50,990	42,480	42,620	48,720	45,500	49,060	48,420
20	50,150	47,780	50,970	42,780	48,530	50,640	52,500	43,310	48,510	45,620	48,860	41,580
21	50,750	42,730	50,570	43,010	50,070	50,730	41,880	52,590	48,660	46,060	48,690	41,510
22	51,220	42,630	49,820	43,030	57,910	48,580	41,820	43,540	49,030	50,890	48,310	41,820
23	50,820	50,690	48,480	42,620	50,200	42,510	50,910	42,510	48,810	50,630	42,240	41,660
24	54,760	50,640	42,880	49,990	50,630	49,220	51,170	42,740	48,640	84,950	42,270	41,510
25	50,950	50,680	43,110	50,430	50,440	49,720	51,390	42,790	49,460	49,670	42,440	41,500
26	50,860	50,610	43,100	50,290	49,190	49,640	51,270	42,440	49,200	45,690	49,650	41,480
27	50,640	50,470	42,720	50,010	42,740	51,540	49,390	43,030	49,210	45,690	49,360	41,670
28	50,540	50,590	49,950	47,840	51,270	42,340	49,280	51,810	47,820	44,210	48,700	48,110
29	50,950	52,610	50,860	42,780	49,870	42,320	49,690	42,590	44,600	44,000	48,540	48,130
30	50,930	N/A	49,910	42,700	49,990	42,270	41,950	42,350	44,620	41,960	41,900	46,970
31	51,460	N/A	50,100	N/A	50,560	N/A	48,570	42,820	N/A	45,930	N/A	41,020
Monthly Max	54,760	56,560	53,200	59,540	57,910	51,540	57,680	52,590	67,090	84,950	50,990	52,620

Municipal Drinking Water Licence Max (m3/day)	118,000
Yearly Max (m3)	84,950

Table 5 – Net to Distribution System Daily Totals (m3)

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	42,938	46,531	50,122	48,227	42,687	46,232	45,318	47,473	43,323	46,210	47,079	42,271
2	42,773	48,904	52,072	48,631	46,149	45,727	45,305	47,113	44,795	46,019	43,946	42,352
3	41,545	48,380	51,976	49,859	43,422	42,616	48,395	47,514	44,728	47,416	46,390	41,477
4	40,992	49,056	50,725	47,049	42,737	47,281	48,228	48,245	43,943	46,645	46,456	44,016
5	41,972	48,825	51,912	50,254	43,766	47,118	46,099	47,423	46,375	43,217	45,381	42,008
6	42,721	47,813	51,428	47,279	42,659	44,885	47,840	47,334	46,755	41,859	43,823	42,272
7	45,311	47,234	48,412	48,586	40,326	43,631	47,927	47,817	45,778	45,396	42,955	41,914
8	42,465	46,647	52,149	46,393	43,372	43,355	46,475	44,608	48,096	46,367	44,663	44,322
9	47,147	47,751	49,357	44,451	43,272	42,758	45,125	42,301	43,194	47,545	47,056	44,353
10	46,187	48,376	51,863	45,552	44,398	42,426	43,070	41,835	42,405	49,866	45,218	45,712
11	49,059	48,257	52,210	46,398	41,781	44,215	44,966	42,022	43,512	49,957	43,286	47,145
12	47,795	50,276	49,828	46,074	43,952	44,215	44,536	43,403	45,309	48,466	44,148	43,382
13	45,741	48,775	51,548	46,269	46,172	43,851	48,422	45,125	43,883	47,253	44,963	43,993
14	43,346	48,243	50,419	47,896	43,002	44,050	48,954	44,298	47,135	44,708	46,209	44,666
15	44,465	45,828	51,561	45,561	42,904	43,188	47,655	41,261	46,721	44,130	46,700	43,558
16	42,140	49,223	51,275	49,661	44,173	43,488	46,408	43,297	47,171	45,011	47,342	43,720
17	45,099	49,314	52,040	43,549	45,284	45,578	42,690	41,801	46,359	48,289	44,831	47,000
18	45,825	47,015	51,689	45,418	43,116	47,339	41,598	43,649	50,134	47,171	43,751	47,129
19	47,473	49,447	48,575	42,616	43,189	46,341	42,036	42,318	49,408	47,715	46,455	43,269
20	50,070	44,937	48,189	41,529	44,482	50,518	43,459	42,345	44,764	46,919	45,446	44,101
21	48,333	42,879	53,298	43,319	42,000	49,990	43,168	43,364	47,944	48,470	45,923	41,658
22	50,031	42,033	50,499	43,018	42,193	41,871	41,486	44,331	48,839	51,333	45,915	42,428
23	50,205	44,335	46,998	43,907	46,820	42,658	45,552	40,707	51,097	47,059	41,315	40,156
24	48,248	46,629	45,962	43,598	47,697	46,353	48,608	40,210	48,783	46,972	44,800	42,249
25	48,341	48,882	46,672	46,207	45,726	47,869	49,504	43,179	47,931	48,137	43,065	42,017
26	46,776	49,877	43,830	45,575	44,757	52,273	52,343	43,840	45,631	48,668	45,930	42,030
27	50,694	49,275	44,630	48,121	43,136	42,608	49,271	44,047	47,646	47,461	46,276	42,972
28	48,925	45,018	48,266	45,143	39,157	45,455	47,773	43,623	45,824	44,326	46,790	42,003
29	49,043	51,617	50,399	43,249	45,304	42,506	49,575	41,708	48,515	42,707	44,704	42,027
30	49,089	N/A	50,551	43,494	46,454	41,844	44,950	42,251	44,293	42,670	43,498	44,303
31	48,963	N/A	51,069	N/A	38,921	N/A	43,211	42,834	N/A	42,427	N/A	44,012
Total	1,433,709	1,381,373	1,549,520	1,376,880	1,353,004	1,352,234	1,429,943	1,361,272	1,390,288	1,440,384	1,354,310	1,344,515
Average	46,249	47,634	49,985	45,896	43,645	45,074	46,127	43,912	46,343	46,464	45,144	43,371
Min	40,992	42,033	43,830	41,529	38,921	41,844	41,486	40,210	42,405	41,859	41,315	40,156
Max	50,694	51,617	53,298	50,254	47,697	52,273	52,343	48,245	51,097	51,333	47,342	47,145

Yearly Average (m3)	45,820
Yearly Min (m3)	38,921
Yearly Max (m3)	53,298

Table 6 – City East Flow Daily Totals (m3)

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	7,460	8,930	8,620	7,636	8,147	9,198	7,591	8,339	6,741	7,170	7,243	7,472
2	7,435	8,490	8,093	8,934	8,472	9,816	8,029	8,173	7,012	6,962	7,140	7,542
3	7,715	8,015	7,993	8,679	9,308	9,100	8,163	7,551	7,583	6,642	7,292	7,663
4	8,362	9,034	8,880	7,647	8,120	9,803	8,106	7,745	8,364	7,477	6,664	7,348
5	7,893	9,102	8,582	9,058	8,580	10,027	7,995	7,149	7,268	6,759	7,475	7,492
6	7,631	8,625	7,871	8,439	9,044	8,835	8,007	7,134	8,363	3,054	6,863	7,340
7	8,028	7,995	8,024	8,128	8,690	8,000	8,182	7,123	7,175	7,000	6,769	7,416
8	8,569	8,760	8,217	8,802	8,105	8,222	7,931	8,412	6,937	7,000	7,258	7,563
9	8,287	8,159	8,788	8,783	8,000	8,417	8,317	6,604	7,066	7,000	7,282	7,507
10	7,973	8,305	7,737	7,841	8,853	8,749	7,646	6,708	7,260	6,864	7,448	7,535
11	8,003	8,239	9,548	8,906	8,706	7,951	7,441	6,759	7,022	6,710	7,088	7,894
12	7,510	8,820	11,482	8,725	8,218	7,974	7,607	7,274	7,124	6,215	7,182	7,804
13	7,721	8,311	7,631	7,970	8,270	8,781	7,708	7,971	7,644	6,580	7,234	7,706
14	7,705	8,306	8,568	8,833	8,992	8,332	8,215	8,045	8,004	7,319	6,967	7,910
15	8,829	8,238	8,492	8,960	8,735	7,933	7,830	8,319	8,009	7,027	7,252	7,866
16	7,520	8,335	7,687	8,361	8,372	7,966	7,756	7,652	7,483	7,373	7,226	7,378
17	8,958	8,691	8,343	7,926	8,207	8,993	7,228	6,791	7,647	7,027	7,435	7,485
18	7,288	7,784	8,681	8,877	9,450	8,822	7,540	7,213	8,116	6,848	7,536	7,837
19	8,703	7,873	8,595	8,635	8,773	8,478	7,105	7,341	7,360	7,071	7,586	7,863
20	8,637	8,777	7,928	7,905	9,279	8,252	8,092	6,629	7,436	7,381	7,496	7,609
21	7,914	8,680	8,786	8,333	9,701	8,677	8,103	7,239	7,647	6,866	7,284	7,468
22	8,833	8,112	8,427	9,044	9,487	8,280	7,258	7,335	7,926	8,831	7,408	7,504
23	8,839	7,944	7,881	8,504	9,377	8,000	7,303	7,352	6,993	6,968	7,490	6,944
24	8,436	7,707	8,302	8,349	9,923	7,853	7,379	6,866	7,646	7,851	7,391	8,364
25	8,116	8,434	9,041	8,924	10,358	7,668	7,426	7,690	6,869	6,977	7,023	7,463
26	8,000	9,001	8,386	8,023	8,784	8,465	7,949	7,588	7,227	7,191	7,572	7,051
27	8,931	8,405	8,148	7,938	8,933	7,175	8,474	7,691	6,822	7,578	7,140	7,610
28	8,919	7,811	8,275	8,423	8,524	8,254	8,477	7,480	7,223	6,978	7,339	8,140
29	7,859	8,346	8,007	8,785	8,484	7,383	8,313	7,903	7,334	7,253	6,821	7,800
30	9,321	N/A	8,672	9,199	8,385	7,811	7,385	8,219	7,890	6,670	7,720	7,736
31	8,392	N/A	8,452	N/A	8,141	N/A	6,947	7,213	N/A	7,131	N/A	7,823
Total	253,788	243,228	262,135	254,567	272,418	253,213	241,501	231,508	223,190	215,770	217,622	236,130
Average	8,187	8,387	8,456	8,486	8,788	8,440	7,790	7,468	7,440	6,960	7,254	7,617
Min	7,288	7,707	7,631	7,636	8,000	7,175	6,947	6,604	6,741	3,054	6,664	6,944
Max	9,321	9,102	11,482	9,199	10,358	10,027	8,477	8,412	8,364	8,831	7,720	8,364

Yearly Average (m3)	7,939
Yearly Min (m3)	3,054
Yearly Max (m3)	11,482

POINT PLEASANT WATER TREATMENT PLANT

2024 ANNUAL SUMMARY REPORT

Drinking Water System Number: 220001851
Drinking Water System Owner: City of Kingston
Drinking Water System Category: Large Municipal Residential

Submitted by:
David Fell
President & C.E.O.

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1 INTRODUCTION

This report has been prepared as required under Ontario Regulation 170/03 of the Safe Drinking Water Act (SDWA) to acknowledge compliance with the terms and conditions of the Drinking Water Works Permit (DWWP) and Municipal Drinking Water License (MDWL) issued for the King Street Water Treatment Plant, comment on any incidents of non-compliance during the reporting period, summarize the quantities of the water supplied, and compare those quantities to the rated capacity and flow rates as set out in the system's permit and MDWL during the reporting period.

This report is specific to the Point Pleasant Water Treatment Plant located at 80 Sunny Acres Road in the City of Kingston, the associated distribution system, which serves Kingston's municipal water customers in the areas North to Cataraqui Arena, Hwy #2 west to Westbrook, Bath Road to Coronation Blvd, south of Hwy #401, Hwy #2 east to Milton subdivision, and Hwy #15 north to the St. Lawrence Business Park is known as the Kingston Drinking Water System.

The Kingston Drinking Water System receives water from both the King Street Water Treatment Plant and the Point Pleasant Water Treatment Plant. The Water Treatment Plants and its associated distribution system are owned by the city of Kingston, with Utilities Kingston acting as the operating authority.

2 NON COMPLIANCE

There were no issues of non-compliance with the terms and conditions of the DWWP or MDWL during this reporting period.

3 COMPLIANCE

The Treatment Operations Department of Utilities Kingston, for the City of Kingston, operates and maintains the Point Pleasant Water Treatment Plant (WTP) and complies with the terms and conditions of the Drinking Water Works Permit (DWWP) and Municipal Drinking Water License (MDWL) issued for the WTP. The Utilities Kingston Systems Operations department and the Treatment Operations department of Utilities Kingston operate and maintain the associated distribution system as well as the storage and pumping facilities. Staffing is maintained at levels to ensure adequate numbers of trained and licensed personnel are available for proper operations during emergency or upset conditions, vacation/sick relief, or to deal with equipment breakdown.

Quality Management Systems (QMS), contingency plans, and operations manuals are established and are located in the appropriate facilities and available to appropriate staff.

A QMS for the City of Kingston's drinking water supply systems has been developed and implemented by Utilities Kingston management and staff to ensure the continued safety and security of the community's drinking water by meeting or exceeding the requirements of all relevant legislation and regulations, and the Drinking Water Quality Management Standard (DWQMS).

Operations manuals include information necessary for the day-to-day operations and maintenance of the WTP and distribution system as well as information that may not be regularly used but that might be required to be accessed quickly for various purposes. Contingency plans include information that may be required for proper operation of the WTP or distribution system during emergency or upset conditions and contain items such as emergency plans and contact lists, alternate materials supply sources, and notification lists.

The operations strategy of Utilities Kingston includes ensuring that permits, approvals, and licenses are in place, that efficient maintenance and operations ensures the quality of water supplied to its customers meets or exceeds the minimum requirements as set out in the SDWA, and that permissible flow rates are not exceeded. The City of Kingston, as a means of source water protection, considers the impact of decisions made within its authority on the drinking water supply source for the WTP.

Flow measuring devices for measuring the amount of water taken from Lake Ontario, and the amount of water supplied to the distribution system are calibrated annually by a third party. Accuracy in these measurements ensures that treatment chemicals are precisely applied and that flows do not exceed the capacity at which the WTP is designed to be effective. These flows are recorded to provide current and historical information which is used for operational decision making and to allow both the public and the Ministry of the Environment, Conservation and Parks (MECP) the ability to review WTP operations.

Water quality analyzers that monitor parameters such as chlorine residual and turbidity of critical process streams and water directed to the distribution system are alarm equipped and are maintained in accordance with the manufacturer's recommendations as well as the conditions of the DWWP/MDWL.

Water sampling is conducted to a level that exceeds the minimum requirements of schedule 13 of Ontario Regulation 170/03 of the Safe Drinking Water Act, and includes additional sampling as well as sampling recommended in the first Engineers Report for the WTP. Raw water sampling is conducted to give operational staff information required to determine the level of treatment required to make the water potable. In-plant process stream samples provide monitoring of treatment processes. Treated and distribution system sampling provides information regarding the quality of water delivered to customers. All of these samples are analyzed by either licensed staff or by laboratories accredited by the Standards Council of Canada through the Canadian Association for Environmental Analytical Laboratories.

All sampling information, annual reports and all other documentation required by the DWWP, and regulations are available for public viewing at the WTP during normal business hours. Annual Reports are also available on the Utilities Kingston website as well as at the Utilities Kingston and City of Kingston offices. Residents of the City of Kingston are encouraged to review this information, the availability of which is advertised through various local media.

4 NOTIFICATIONS

Under Ontario Regulation 170/03, notifications were required for any instances where a sample result indicated that a parameter used to measure water quality exceeded a Maximum Acceptable Concentration (MAC). Once a notification is received from a laboratory or an observation of any other indicator of adverse water quality is made by operations personnel, corrective action as dictated by the regulations is initiated in an effort to confirm the initial result. If confirmed, further action may be recommended by the Medical Officer of Health. If not confirmed, sampling will typically return to the normal schedule, or depending on the parameter, Utilities Kingston may choose to increase the sampling frequency to monitor the parameter more closely for a period of time.

4.1 EVENTS REQUIRING NOTIFICATIONS

There were no events within the Point Pleasant Water Treatment Plant that required notification during this reporting period.

5 QUANTITY OF WATER SUPPLIED

Listed in Tables 3 and 4 following this report are the treated water flows for the Point Pleasant Water Treatment Plant. The serviced population for the King Street WTP and Point Pleasant WTP is 132,485 (population from Census data for 2021). The annual average daily use was 19,229 m^3/day from Point Pleasant WTP and 45,820 m^3/day from King Street WTP. Total average per capita use was calculated at 490 litres per person/day. The metered residential use for 2024 is currently pending. The typical Canadian average is 250-350 litres per person/day residential use (source: Environment Canada). The city has imposed limitations or restrictions on water use when necessary.

System losses through leakage, mainly due to the age of the distribution system infrastructure, also account for a significant portion of the "unaccounted for" water. Water systems operators perform proactive leak detection throughout the year and perform reactive leak detection based on reports of high water demand.

6 FLOW RATE EXCEEDANCES

There were no instances during this reporting period where flows at Point Pleasant WTP exceeded the daily maximum allowable flow rate of 80,000 m^3/day. Listed in Tables 1 and 2 following this report are the raw water flows (water taken from Lake Ontario) for the Point Pleasant Water Treatment Plant.

7 TREATMENT CHEMICALS USED

There are two treatment chemicals in use at this treatment plant. Chlorine is used as the disinfectant, and Poly Aluminum Chloride (PACl) is used as the coagulant for the WTP. A more detailed description of the function of each of these chemicals and where they fit in the treatment processes is contained in the annual reports produced for this treatment plant.

Chlorine is dosed at the treatment plant at a rate which ensures an adequate residual is maintained at those points in the distribution system that are farthest from the point of entry of treated water to the system and, that an adequate chlorine Contact Time (CT) value is maintained for the rate of flow. Average chlorine dosages for this treatment plant are approximately 2.75 mg/L. Residuals are routinely measured in the distribution system, and the treatment plant chlorine dosage is adjusted as required to ensure the chlorine residual stays above the critical control limit of 0.20 mg/L. The critical control limit is chosen to ensure operators have ample time to respond and correct issues before the chlorine residual reaches the regulatory limit of 0.05 mg/L.

Typical PACl dosage for this treatment plant is 6.45 mg/L. This dosage is also adjusted to ensure efficiency in the coagulation process as various changes occur in the raw water. Changes are based on things such as pH, temperature, turbidity, and the aluminum residual in the treated water.

8 SUMMARY

The Point Pleasant Water Treatment Plant supplied water to residents of Kingston at rates which allowed adequate treatment. Water of good quality which is safe to drink was produced by the treatment plant during this reporting period.

Further information is available for this system and is included in the annual reports which can be accessed from the Utilities Kingston Website at http://www.utilitieskingston.com, Kingston City Hall, or the Utilities Kingston offices. For further information about this report or any questions regarding accessibility, contact Robert Cooney at rcooney@utilitieskingston.com, or call 613-546-1181 Ext 2291.

9 FLOWS

Raw, Treated, and Distribution Flows are summarized in the following tables.

Table 1 – Raw Water Flow Daily Totals (m3)

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	16,760	22,617	23,300	19,230	21,695	22,997	20,284	23,173	23,477	19,407	14,165	20,223
2	16,124	20,311	18,104	21,120	20,142	22,416	21,680	22,238	22,016	18,281	17,505	20,169
3	21,084	23,128	23,025	17,666	23,328	25,206	20,825	19,043	23,922	19,332	16,346	19,561
4	21,940	20,181	21,690	21,923	19,419	28,634	22,888	20,616	25,854	20,684	15,066	20,137
5	19,492	18,642	18,987	17,075	21,054	25,850	24,215	19,383	23,734	21,229	16,336	20,393
6	18,876	20,205	19,439	21,554	23,239	24,914	21,882	21,091	22,705	20,767	19,286	18,814
7	20,894	22,266	24,353	21,923	23,447	24,679	25,205	19,938	20,365	19,048	17,195	19,172
8	24,530	22,360	21,124	24,036	21,680	22,590	24,499	25,614	17,946	17,376	15,842	16,970
9	17,425	19,026	17,717	19,813	22,522	24,471	26,382	25,094	22,007	17,111	13,208	17,698
10	18,469	19,195	19,400	22,753	20,324	23,479	25,112	23,660	23,577	15,783	17,164	17,096
11	16,646	20,693	17,371	23,296	21,495	22,477	22,386	21,364	21,483	14,261	18,428	17,369
12	18,542	16,994	17,442	20,133	20,319	24,780	22,095	23,198	21,172	13,714	18,226	22,531
13	19,091	18,335	18,712	19,795	17,234	26,712	17,465	21,784	24,043	12,830	17,812	15,665
14	21,465	18,188	20,195	21,000	22,196	25,920	19,888	22,477	19,927	15,265	16,243	18,891
15	23,189	23,682	19,074	22,133	22,462	25,646	20,312	29,950	22,746	15,655	14,115	18,870
16	25,297	18,700	18,764	18,350	20,657	24,951	21,451	24,027	20,530	17,246	14,309	17,934
17	22,094	15,347	19,656	25,343	21,188	24,714	24,822	22,501	22,570	16,205	17,239	15,003
18	21,998	16,274	20,076	20,175	26,718	24,224	24,231	21,449	16,928	15,407	18,990	13,565
19	20,890	18,611	22,828	23,408	24,470	24,255	25,286	20,910	20,049	16,795	15,299	19,261
20	15,821	20,576	18,987	25,409	27,854	22,201	26,085	19,778	20,981	21,639	16,931	15,532
21	20,640	24,463	17,543	22,853	26,032	19,638	26,772	21,137	19,030	18,658	14,937	18,596
22	18,414	24,866	20,226	25,012	26,800	19,938	25,739	19,667	18,934	17,669	16,396	19,024
23	18,685	20,877	22,404	22,197	24,816	20,286	24,561	22,738	16,175	17,690	20,152	19,052
24	18,705	18,944	26,981	24,775	23,888	23,907	21,990	23,470	19,541	17,856	17,597	17,769
25	20,104	20,146	22,445	19,135	23,991	22,875	18,416	21,270	15,245	16,908	19,575	15,495
26	21,642	19,131	29,287	20,244	26,375	15,595	18,162	23,780	20,569	17,156	25,253	16,069
27	17,965	20,632	27,911	15,620	23,881	18,182	19,745	22,993	16,525	19,241	20,156	16,455
28	21,082	25,743	22,251	20,418	19,458	22,609	23,582	22,441	18,648	21,148	16,413	18,393
29	19,613	15,541	17,182	20,884	21,191	22,419	21,375	25,335	18,614	20,061	17,989	19,047
30	18,025	N/A	18,992	22,608	23,701	19,929	25,744	25,359	23,347	18,487	17,771	15,339
31	23,067	N/A	17,469	N/A	21,328	N/A	23,952	20,925	N/A	20,061	N/A	16,371
Total	618,569	585,674	642,935	639,881	702,904	696,494	707,031	696,403	622,660	552,970	515,944	556,464
Average	19,954	20,196	20,849	21,329	22,719	23,216	22,769	22,516	20,755	17,764	17,198	18,003
Min	15,821	15,347	17,182	15,620	17,234	15,595	17,465	19,043	15,245	12,830	13,208	13,565
Max	25,297	25,743	29,287	25,409	27,854	28,634	26,772	29,950	25,854	21,639	25,253	22,531

Permit To Take Water (m3/day)	90,000
Yearly Average (m3)	20,606
Yearly Min (m3)	12,830
Yearly Max (m3)	29,950

Table 2 – Peak Raw Water Flow Daily Totals (m3)

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	28,849	39,255	39,100	35,678	33,941	42,661	29,181	35,600	37,899	27,796	27,505	31,771
2	28,870	26,235	26,179	35,778	32,881	41,295	29,191	31,502	31,391	26,090	28,681	29,997
3	36,277	39,218	46,021	35,568	35,859	34,951	35,844	27,266	35,817	39,110	28,502	27,559
4	35,623	39,215	38,594	29,043	39,957	41,042	41,740	28,142	35,684	28,768	27,100	39,854
5	35,347	26,227	26,173	40,437	35,810	41,002	39,709	27,439	31,919	28,913	27,521	30,005
6	35,636	44,829	29,024	38,943	35,901	38,379	37,399	30,803	45,299	38,989	27,543	30,506
7	39,806	43,223	38,297	29,043	40,271	38,131	42,511	31,101	37,736	27,730	28,553	28,564
8	35,625	42,707	38,427	41,778	42,178	45,554	43,644	35,516	31,650	28,874	28,728	28,655
9	35,089	38,418	38,143	29,090	37,970	39,550	43,100	35,507	31,673	25,926	22,893	28,380
10	31,453	29,039	46,341	40,715	40,434	39,877	38,194	35,177	31,883	28,529	27,464	27,821
11	31,656	28,899	30,987	42,716	38,036	38,324	31,028	36,046	35,925	21,881	27,090	28,583
12	30,432	28,898	31,387	38,480	38,369	40,774	40,081	35,618	38,945	22,582	39,178	38,083
13	35,695	36,808	31,303	38,454	26,644	37,573	35,529	35,571	38,453	20,054	26,286	28,060
14	39,346	41,304	38,480	38,432	41,701	35,511	38,320	45,042	37,352	29,531	31,099	34,096
15	39,223	37,885	40,640	41,655	38,236	44,239	31,246	36,149	39,177	29,632	23,370	34,530
16	46,041	31,757	28,996	38,419	35,100	43,844	35,231	31,793	29,000	28,775	22,840	28,500
17	27,810	31,455	38,192	39,735	44,720	43,517	43,063	30,416	37,274	25,864	27,821	22,637
18	40,234	31,615	30,512	44,321	44,126	44,005	40,378	28,262	27,621	31,645	35,683	25,528
19	31,610	31,232	40,890	44,643	44,412	45,845	40,337	31,073	34,906	31,981	35,316	30,395
20	31,540	31,560	32,780	44,926	44,946	35,845	36,197	39,503	30,028	35,218	27,805	25,745
21	31,513	35,501	35,539	42,680	35,609	31,471	43,238	31,487	28,224	29,911	26,089	37,388
22	31,488	42,961	26,224	44,096	45,027	30,008	40,133	35,188	28,406	23,137	21,956	25,845
23	35,524	39,678	37,932	44,059	39,866	35,458	39,256	29,283	31,797	27,737	28,783	25,875
24	35,508	31,285	46,139	44,279	39,200	35,429	30,033	29,197	36,328	31,709	27,592	25,975
25	31,642	40,243	46,642	44,417	39,472	35,237	29,136	27,793	25,903	29,180	38,558	22,374
26	35,479	39,981	42,712	31,507	39,853	31,518	29,163	28,987	29,827	31,352	39,398	29,800
27	31,576	31,401	41,998	26,418	36,033	26,552	29,050	29,202	26,016	35,319	39,046	31,500
28	35,512	39,854	35,772	35,559	35,931	35,427	38,054	37,421	24,609	30,664	28,231	31,362
29	35,748	26,051	31,300	39,286	35,981	38,959	29,124	38,567	27,685	36,114	31,778	27,649
30	36,499	N/A	31,704	40,718	42,134	38,094	33,615	40,048	35,909	33,018	31,773	31,557
31	39,634	N/A	31,184	N/A	40,318	N/A	29,340	44,919	N/A	28,603	N/A	27,425
Monthly Max	46,041	44,829	46,642	44,926	45,027	45,845	43,644	45,042	45,299	39,110	39,398	39,854

Permit To Take Water (m3/day)	90,000
Yearly Max (m3)	46,642

Table 3 – Treated Water Flow Daily Totals (m3)

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	15,745	22,062	21,576	18,958	21,246	21,932	19,283	22,556	22,361	18,751	13,501	19,623
2	16,020	19,544	17,357	20,056	19,580	21,520	20,979	21,088	21,437	17,625	16,926	19,418
3	21,113	22,307	22,213	16,428	22,605	24,340	19,655	18,448	23,151	18,664	16,141	18,944
4	21,567	19,352	20,743	21,055	19,095	27,537	21,502	19,792	25,103	20,022	14,362	18,859
5	18,670	18,140	18,674	16,626	20,124	25,147	22,888	18,588	22,984	20,804	15,818	19,850
6	18,426	19,774	19,196	20,420	22,491	24,149	20,588	20,432	21,512	20,242	18,625	18,161
7	20,033	21,430	23,360	21,055	23,153	23,734	23,576	19,298	19,189	18,244	17,443	18,581
8	23,727	21,371	20,319	22,871	20,894	21,744	24,131	24,495	17,497	16,639	15,212	16,752
9	17,166	18,482	17,881	19,147	21,779	24,102	24,594	24,368	21,287	16,491	12,627	16,905
10	17,846	18,335	18,489	21,902	19,789	22,623	23,534	22,216	22,909	15,407	17,013	16,523
11	16,162	20,135	16,764	22,362	21,049	21,919	20,979	20,736	20,769	13,637	17,882	16,675
12	17,711	16,166	17,102	19,446	20,086	23,950	20,348	22,447	20,620	13,436	17,983	21,865
13	18,800	17,974	18,318	19,167	16,299	26,377	16,550	21,196	23,309	12,573	17,189	15,398
14	21,551	18,267	19,634	19,870	21,430	25,107	18,285	21,821	18,909	14,976	15,528	17,326
15	21,947	22,752	18,431	21,236	22,734	24,709	18,868	29,257	22,033	15,825	14,043	17,798
16	24,371	17,535	18,188	17,602	19,713	24,861	20,689	23,188	19,857	16,480	14,039	17,102
17	21,281	15,171	18,925	24,212	20,310	23,904	23,005	20,765	21,360	15,533	17,158	14,286
18	21,158	15,634	20,656	19,512	25,954	23,282	23,058	20,677	16,103	15,502	18,223	13,679
19	19,982	18,389	22,032	22,121	23,943	23,392	23,193	20,206	19,493	16,611	14,725	18,716
20	15,797	20,106	18,442	24,288	26,971	21,401	24,125	18,805	20,261	20,950	16,257	15,685
21	19,798	23,602	16,697	21,847	25,661	18,702	25,083	20,315	17,795	17,889	14,306	18,289
22	18,425	24,448	20,050	24,071	25,639	19,130	24,791	18,826	18,044	16,958	15,772	18,574
23	17,674	20,077	22,145	21,170	23,960	19,316	22,779	21,889	15,339	17,142	19,845	18,552
24	18,684	18,494	26,066	23,491	23,023	23,272	21,359	22,758	18,843	17,609	17,119	17,404
25	19,126	19,414	21,741	17,871	23,612	21,918	17,470	20,590	15,032	16,449	18,928	15,347
26	21,042	18,958	28,163	19,480	25,251	15,065	17,243	23,146	19,518	16,524	24,156	16,134
27	17,484	19,802	26,818	15,296	22,972	17,382	19,054	22,258	15,921	18,603	19,372	16,015
28	20,428	24,883	21,233	20,331	18,798	21,539	22,187	21,592	18,734	20,492	15,758	18,072
29	18,661	15,851	16,490	20,493	20,114	21,416	20,632	24,147	17,857	19,709	17,282	18,323
30	21,319	N/A	18,747	21,795	22,961	18,947	24,534	24,120	22,920	17,795	17,151	15,369
31	22,203	N/A	16,499	N/A	20,669	N/A	22,829	19,794	N/A	19,429	N/A	15,810
Total	603,917	568,455	622,949	614,179	681,905	672,417	667,791	669,814	600,147	537,011	500,384	540,035
Average	19,481	19,602	20,095	20,473	21,997	22,414	21,542	21,607	20,005	17,323	16,679	17,420
Min	15,745	15,171	16,490	15,296	16,299	15,065	16,550	18,448	15,032	12,573	12,627	13,679
Max	24,371	24,883	28,163	24,288	26,971	27,537	25,083	29,257	25,103	20,950	24,156	21,865

Municipal Drinking Water Licence Max (m3/day)	80,000
Yearly Average (m3)	19,887
Yearly Min (m3)	12,573
Yearly Max (m3)	29,257

Table 4 – Peak Treated Water Flow Daily Totals

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	22,502	28,515	29,023	24,480	32,755	29,128	25,590	29,908	30,276	24,454	20,583	26,353
2	25,859	26,080	29,228	26,201	11,229	30,222	25,346	32,719	26,510	26,604	28,673	24,166
3	26,671	26,015	29,685	24,708	26,047	29,727	25,531	24,472	30,267	35,018	25,738	25,814
4	29,847	26,242	28,659	30,012	30,056	33,855	30,014	23,061	26,117	24,481	24,490	30,555
5	28,739	29,996	26,022	28,492	30,162	33,653	26,193	20,668	30,352	29,225	22,756	28,498
6	25,949	30,800	29,527	25,897	30,269	29,201	24,588	27,619	29,220	30,227	9,656	26,264
7	29,951	29,956	28,649	30,012	33,492	30,074	30,128	25,739	29,425	22,278	26,622	29,323
8	26,218	29,509	32,717	29,398	29,498	30,058	29,318	32,391	28,561	25,524	30,230	28,635
9	30,210	25,895	33,953	25,979	26,412	29,757	29,890	28,737	50,024	25,419	18,307	25,326
10	28,688	22,547	32,538	33,304	30,536	28,585	25,582	26,662	51,950	20,588	22,226	10,102
11	22,881	26,232	26,074	33,916	28,579	26,257	26,116	34,295	30,078	21,692	22,316	29,242
12	26,072	26,113	26,620	28,343	26,616	29,903	25,492	32,549	30,242	18,597	28,706	28,573
13	26,294	27,140	29,513	25,537	25,869	33,937	25,714	33,317	30,019	18,864	26,778	26,688
14	30,346	30,047	32,991	25,912	34,160	32,656	33,821	34,194	28,724	29,414	20,664	26,368
15	29,645	28,650	28,668	29,499	32,595	28,619	26,213	32,506	32,843	29,833	20,588	29,131
16	30,728	24,572	25,306	29,942	33,681	33,688	26,436	28,524	26,250	30,148	19,320	24,405
17	26,103	22,232	26,166	28,721	32,593	28,912	30,095	26,757	24,602	22,902	24,145	22,237
18	29,787	25,108	30,512	29,939	29,944	29,904	30,745	26,428	24,704	30,485	30,230	23,109
19	26,096	30,056	29,933	29,567	29,357	28,925	29,690	30,320	32,656	33,458	28,447	26,350
20	22,445	28,607	26,087	29,993	32,915	25,570	29,842	28,604	28,683	30,348	25,765	24,550
21	22,183	29,903	25,914	30,036	33,905	22,529	28,491	26,453	22,227	28,598	26,458	25,552
22	26,153	30,353	25,967	29,893	33,137	22,138	31,156	24,537	22,951	20,905	10,884	25,832
23	26,069	30,145	33,727	29,531	29,821	25,619	28,511	25,489	25,622	26,503	25,570	22,765
24	25,773	28,651	33,127	30,321	29,927	25,984	30,248	28,520	30,190	29,804	25,463	22,238
25	22,701	29,852	33,453	18,180	29,984	24,584	25,474	24,850	24,502	25,389	29,981	21,135
26	25,727	29,931	33,447	22,406	33,190	20,844	24,953	25,881	25,255	25,679	30,782	29,407
27	22,226	29,767	33,882	22,356	28,658	25,307	25,390	30,446	25,726	30,448	28,588	26,439
28	26,334	34,284	28,576	29,859	25,605	22,806	29,450	30,095	26,378	30,373	26,323	26,521
29	26,288	22,255	22,916	30,907	33,868	29,198	26,153	30,392	22,941	30,240	25,560	24,498
30	30,796	N/A	22,992	34,411	32,743	25,481	26,035	30,235	29,345	28,505	25,466	26,307
31	33,409	N/A	27,049	N/A	28,613	N/A	30,039	30,270	N/A	25,776	N/A	26,555
Monthly Max	33,409	34,284	33,953	34,411	34,160	33,937	33,821	34,295	51,950	35,018	30,782	30,555

Municipal Drinking Water Licence Max (m3/day)	80,000
Yearly Max (m3)	51,950

Table 5 – Net to Distribution System Daily Totals (m3)

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	14,718	21,419	21,712	18,499	20,127	21,093	18,607	22,312	21,486	18,488	12,445	19,430
2	15,742	18,950	16,861	19,361	19,882	20,896	21,031	19,906	20,799	10,374	17,022	18,547
3	20,397	21,470	21,588	15,787	22,219	24,446	19,169	18,052	23,170	17,702	15,334	18,382
4	20,500	17,986	19,573	20,399	18,204	27,194	20,798	19,712	26,308	18,935	13,916	19,415
5	18,030	17,611	18,279	16,528	20,183	24,878	22,501	17,782	22,086	19,999	14,848	19,202
6	18,538	19,978	18,572	19,250	21,464	22,946	19,493	20,450	20,407	20,037	17,683	17,152
7	19,088	20,749	23,078	20,372	22,399	22,714	22,932	20,877	19,176	17,677	17,262	17,616
8	22,093	20,021	18,850	21,615	19,892	20,978	24,565	23,892	16,945	16,393	14,341	15,922
9	17,573	18,306	17,438	19,159	20,768	24,224	23,493	23,676	20,522	16,631	13,079	17,129
10	17,571	18,412	18,069	21,952	19,876	21,468	14,115	19,875	22,805	14,249	16,293	14,688
11	15,436	19,059	16,887	21,245	20,015	21,714	19,503	19,687	20,391	12,953	17,104	17,639
12	17,450	15,481	16,165	18,556	19,865	22,842	19,993	21,639	19,332	13,905	16,795	20,393
13	18,481	17,816	16,754	18,206	15,598	26,535	15,140	20,708	23,191	11,320	16,775	14,731
14	18,888	18,286	20,156	20,156	21,976	23,867	18,568	21,655	18,358	14,524	15,374	16,739
15	22,926	21,029	17,833	19,971	21,239	24,151	18,040	28,602	22,200	14,811	13,007	17,547
16	23,289	17,359	17,953	19,543	18,809	24,247	20,379	21,954	19,227	16,141	13,355	16,454
17	21,383	14,639	17,926	24,102	20,190	22,757	23,102	20,694	20,082	15,329	16,795	12,768
18	20,559	14,916	19,492	18,621	25,491	23,468	21,826	19,668	15,642	14,503	17,860	13,921
19	19,247	17,592	22,143	21,396	13,333	23,205	23,123	19,319	19,399	16,037	14,490	17,900
20	15,285	19,647	19,186	24,025	26,318	20,669	24,989	18,863	18,778	20,167	15,494	14,558
21	18,889	22,946	14,856	21,341	25,612	17,991	23,887	19,172	16,971	17,323	13,311	17,977
22	18,078	23,864	19,468	23,430	24,946	18,760	23,537	18,916	17,943	15,785	15,484	18,146
23	16,821	19,626	21,109	19,880	23,781	18,366	22,800	20,949	15,106	18,068	19,842	18,072
24	18,108	18,684	25,636	23,053	22,545	22,487	21,017	22,368	17,784	16,030	15,872	16,571
25	18,614	18,565	20,772	17,190	23,044	21,142	16,537	19,544	14,658	16,317	18,465	14,875
26	20,553	18,456	28,223	19,427	24,318	15,240	17,055	22,726	19,194	15,347	23,321	15,064
27	17,482	19,176	26,645	14,769	22,749	16,751	18,467	21,718	15,045	18,318	20,100	16,003
28	19,030	24,301	20,337	20,461	17,616	25,168	21,427	20,690	18,557	19,487	14,710	17,868
29	18,113	14,467	15,971	19,013	19,872	19,174	20,199	24,677	16,995	17,737	16,011	17,803
30	20,407	N/A	18,284	20,953	22,098	18,297	23,875	23,357	21,938	18,814	15,929	14,074
31	22,569	N/A	15,902	N/A	20,282	N/A	21,802	19,042	N/A	18,735	N/A	14,840
Total	585,859	550,807	604,917	589,320	654,710	657,667	641,970	652,482	584,496	512,136	482,318	521,426
Average	18,899	18,993	19,513	19,644	21,120	21,922	20,709	21,048	19,483	16,521	16,077	16,820
Min	14,718	14,467	14,856	9,558	13,333	15,240	14,115	17,782	14,658	10,374	12,445	12,768
Max	23,289	24,301	28,223	24,102	26,318	27,194	24,989	28,602	26,308	20,167	23,321	20,393

Yearly Average (m3)	19,229
Yearly Min (m3)	9,558
Yearly Max (m3)	28,602

CANA WATER TREATMENT PLANT

2024 ANNUAL SUMMARY REPORT

Drinking Water System Number: 220006053
Drinking Water System Owner: City of Kingston
Drinking Water System Category: Small Municipal Residential

Submitted by:
David Fell
President & C.E.O.

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1 INTRODUCTION

This annual summary report has been prepared as required under Ontario Regulation 170/03 of the Safe Drinking Water Act (SDWA) to acknowledge compliance with the terms and conditions of the Drinking Water Works Permit (DWWP) and the Municipal Drinking Water License (MDWL) issued for the Cana Drinking Water System, comment on any incidents of non-compliance during the reporting period, summarize the quantities of the water supplied, and compare those quantities to the rated capacity and flow rates approved in the system's permits and MDWL during the reporting period.

This report is specific to the Cana Water Treatment Plant (WTP) located in the Cana Subdivision, and its associated distribution system serving customers on Marian Crescent, Cana Boulevard, and Rochdale Crescent. The groundwater well and its associated distribution system are owned by the City of Kingston, with Utilities Kingston acting as operating authority.

2 NON COMPLIANCE

There were no issues of non-compliance with the terms and conditions of the DWWP or MDWL during this reporting period.

3 COMPLIANCE

The Treatment Operations department of Utilities Kingston, for the City of Kingston, operates and maintains the Cana Well System and complies with the terms and conditions of the DWWP and MDWL for the Cana Water Treatment System. The Utilities Kingston Systems Operations department and the Treatment Operations department of Utilities Kingston operate and maintain the associated distribution system. Staffing is maintained at levels to ensure adequate numbers of trained and licensed personnel are available for proper operations during emergency or upset conditions, vacation/sick relief, or to deal with equipment breakdown.

Quality Management Systems (QMS), response plans, and operation manuals are established and are located in the appropriate facilities and available to appropriate staff.

A QMS for the City of Kingston's drinking water supply systems has been developed and implemented by Utilities Kingston management and staff to ensure the continued safety and security of the community's drinking water by meeting or exceeding the requirements of all relevant legislation and regulations, and the Drinking Water Quality Management Standard (DWQMS). Operation manuals include information necessary for the day to day operations and maintenance of the WTP and distribution system as well as information that may not be regularly used but that might be required to be accessed quickly for various purposes. Response plans include information that may be required for proper operation of the WTP or distribution system during emergency or upset conditions and contain items such as emergency plans and contact lists, alternate materials supply sources, and notification lists.

The operations strategy of Utilities Kingston includes ensuring that permits and approvals are in place, that efficient maintenance and operations ensures the quality of water supplied to its customers meets or exceeds the minimum requirements as set out in the SDWA, and that permissible flow rates are not exceeded. The City of Kingston, as a means of source water protection, considers the impact of decisions made within its authority on the drinking water supply source for the Cana Water Well System.

Flow measuring devices for measuring the amount of water taken from the well, and the amount of water supplied to the distribution system, are calibrated annually. Accuracy in these measurements ensures that treatment chemicals are precisely applied and that flows do not exceed the capacity at which the system is designed to be effective. These flows are recorded to provide current and historical information, which is used for operational decision making, and to allow both the public

and the Ministry of the Environment, Conservation and Parks (MECP) the ability to review treatment operations.

Water quality analyzers that monitor chlorine residual, turbidity, and conductivity of the water directed to the distribution system are remotely monitored, alarm equipped, and maintained in accordance with the manufacturer's recommendations as well as the conditions of the DWWP and MDWL.

A water sampling program is conducted to exceed the minimum requirements of schedule 13 of Ontario Regulation 170/03 under the Safe Drinking water Act, and includes additional sampling as well as sampling recommended in the first Engineers Report for the Water Treatment System. Raw water sampling is conducted to give operational staff information required to determine the level of treatment required to make the water potable. In-plant process stream samples provide monitoring of treatment processes. Treated and distribution system sampling provides information regarding the quality of water delivered to customers. All of these samples are analyzed by either licensed staff or laboratories accredited by the Standards Council of Canada through the Canadian Association for Environmental Analytical Laboratories.

All sampling information, Annual Reports, and all other documentation required by the DWWP/MDWL and regulations in force during this reporting period is available for public viewing through Utilities Kingston during normal business hours. As the treatment building is typically unstaffed and local access to the information is limited, Utilities Kingston has made an effort to ensure residents supplied by this system receive copies of this information. Annual Reports are also available on the Utilities Kingston website as well as at the Utilities Kingston and City of Kingston offices. Residents of the City of Kingston are encouraged to review this information, the availability of which is advertised through various local media.

4 NOTIFICATIONS

Under Ontario Regulation 170/03, notifications were required for any instances where a sample result indicated that a parameter used to measure water quality exceeded a Maximum Acceptable Concentration (MAC). Once a notification is received from a laboratory or an observation of any other indicator of adverse water quality is made by operations personnel, corrective action as dictated by the regulations is initiated in an effort to confirm the initial result. If confirmed, further action may be recommended by the Medical Officer of Health. If not confirmed, sampling will typically return to the normal schedule, or depending on the parameter, Utilities Kingston may choose to increase the sampling frequency to monitor the parameter more closely for a period of time.

4.1 EVENTS REQUIRING NOTIFICATIONS

- The groundwater supply for the Cana Water Treatment System contains a sodium concentration greater than 20 mg/L which requires a notification to the Medical Officer of Health and to the Spills Action Center if a report under subsection 18 (1) of the Safe Drinking Water Act has not been made in respect of sodium in the preceding 57 months. This notification was last completed in **July of 2022.**
- An adverse water quality indicator notification was provided to the Medical Officer of Health and Spills Action Centre on **June 23rd** due to a power disruption resulting in a loss of pressure in the distribution system. As directed by the Medical Officer of Health, a boil water advisory was issued to the residents serviced by the system. Two sets of bacteriological samples were also collected and tested for E. coli and total coliform. Upon receipt of clear test results, the boil water advisory was rescinded on **June 26th.**

5 QUANTITY OF WATER SUPPLIED

Listed in Table 2 following this report are the treated water flows for the Cana Water Treatment System.

With an annual average daily use of 21.43 m^3/day, the estimated per capita use is 258 L/day. The typical Canadian average is 250 – 350 L per person per day (source: Environment Canada). As customer usage is not metered, system losses are typically estimated based on normal day flows. Known losses include sample flows to water quality analyzers. High flows, occurring typically during summer months, are usually attributed to excessive lawn watering.

6 FLOW RATE EXCEEDANCES

There were no instances during this reporting period where flows exceeded the maximum allowable flow rate of 108 m^3/day. Listed in Table 1 following this report are the raw water flows (water taken from the well) and Table 2 are the treated water flows (water entering the distribution system from the pump-house) for the Cana Water Treatment System.

7 TREATMENT CHEMICALS USED

The only treatment chemical in use in this system is Chlorine, in the form of 12% sodium hypochlorite, which disinfects the water. The sodium hypochlorite is diluted to a 2- 3% solution at the well house prior to the point of injection. The average chlorine dosage for this treatment plant is approximately 3.32 mg/L. Chlorine is dosed at the well at a rate which ensures an adequate residual is maintained at those points in the distribution system that are farthest from the point of entry of treated water to the system and that adequate chlorine Contact Time (CT) is maintained for the rate of flow. Residuals are routinely measured in the distribution system and the treatment plant chlorine dosage is adjusted as required to ensure the chlorine residual stays above the critical control limit of 0.20 mg/L. The critical control limit is chosen to ensure operators have ample time to respond and correct issues before the chlorine residual reaches the regulatory limit of 0.05 mg/L.

8 SUMMARY

The Cana Water Treatment System supplied water to residents of the Cana subdivision at rates which allowed adequate treatment. Water of acceptable quality which is safe to drink was produced by this treatment system during this reporting period.

Further information is available for this system and is included in the annual reports which can be accessed from the Utilities Kingston Website at http://www.utilitieskingston.com, Kingston City Hall, or the Utilities Kingston offices. For further information about this report or any questions regarding accessibility, contact Robert Cooney at rcooney@utilitieskingston.com, or call 613-546-1181 Ext 2291.

9 FLOWS

Raw and Treated flows are summarized in the following tables.

Table 1 – Raw Water Flow Daily Totals (m3)

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	23.50	27.50	40.00	32.00	25.00	33.33	22.00	16.50	19.75	15.50	17.67	18.67
2	23.50	30.00	40.00	32.00	25.00	33.33	22.00	20.33	19.75	16.00	17.67	16.00
3	30.00	30.00	40.00	22.00	29.33	31.50	19.00	20.33	15.00	16.00	17.67	16.00
4	30.00	30.00	20.50	22.00	29.33	31.50	19.00	20.33	18.00	19.33	15.50	17.50
5	27.67	31.00	20.50	25.50	29.33	22.50	21.33	15.00	18.00	19.33	15.50	17.50
6	27.67	31.00	24.50	25.50	25.00	22.50	21.33	15.00	17.67	19.33	15.50	18.33
7	27.67	22.50	24.50	32.33	25.00	26.33	21.33	16.50	17.67	16.00	15.50	18.33
8	22.50	22.50	31.67	32.33	26.50	26.33	25.50	16.50	17.67	16.00	18.33	18.33
9	22.50	27.33	31.67	32.33	26.50	26.33	25.50	18.67	17.50	17.00	18.33	15.50
10	25.00	27.33	31.67	26.00	32.00	25.50	18.50	18.67	17.50	17.00	18.33	15.50
11	25.00	27.33	31.00	26.00	32.00	25.50	18.50	18.67	19.50	19.75	17.50	12.00
12	26.67	30.50	31.00	31.00	32.00	27.00	19.20	17.00	19.50	19.75	17.50	12.00
13	26.67	30.50	25.50	31.00	21.00	27.00	19.20	17.00	20.00	19.75	14.50	24.67
14	26.67	26.50	25.50	31.00	21.00	29.00	19.20	16.50	20.00	19.75	14.50	24.67
15	27.00	26.50	27.67	27.00	27.50	29.00	19.20	16.50	20.00	19.00	15.00	24.67
16	27.00	18.33	27.67	27.00	27.50	29.00	19.20	21.33	20.00	18.00	15.00	13.50
17	25.50	18.33	27.67	29.50	34.33	32.50	23.50	21.33	20.00	18.00	15.00	13.50
18	25.50	18.33	25.00	29.50	34.33	32.50	23.50	21.33	20.50	16.67	18.00	16.50
19	27.00	44.50	25.00	28.67	34.33	27.50	18.67	13.50	20.50	16.67	18.00	16.50
20	27.00	44.50	29.00	28.67	36.50	27.50	18.67	13.50	24.67	16.67	18.50	16.33
21	27.00	23.50	29.00	28.67	36.50	33.00	18.67	18.50	24.67	15.50	18.50	16.33
22	25.50	23.50	30.33	28.50	27.50	33.00	17.00	18.50	24.67	15.50	19.33	16.33
23	25.50	34.00	30.33	28.50	27.50	33.00	17.00	19.67	14.50	16.50	19.33	29.00
24	24.00	34.00	30.33	26.50	31.33	26.00	21.50	19.67	14.50	16.50	19.33	16.67
25	24.00	34.00	27.00	26.50	31.33	26.00	21.50	19.67	18.00	19.00	14.50	16.67
26	28.33	30.50	27.00	29.67	31.33	33.50	20.67	18.50	18.00	19.00	14.50	16.67
27	28.33	30.50	34.00	29.67	25.00	33.50	20.67	18.50	20.33	19.00	18.50	18.00
28	28.33	40.00	30.00	29.67	25.00	22.00	20.67	16.50	20.33	18.00	18.50	18.00
29	27.50	40.00	30.00	32.50	26.50	22.00	19.50	16.50	20.33	18.00	18.67	18.00
30	27.50	N/A	30.00	32.50	26.50	22.00	19.50	19.75	15.50	17.50	18.67	21.00
31	27.50	N/A	30.00	N/A	33.33	N/A	16.50	19.75	N/A	17.50	N/A	17.33
Total	817.51	854.48	908.01	864.01	895.30	849.65	627.51	560.00	574.01	547.50	513.33	550.00
Average	26.37	29.47	29.27	28.80	28.73	28.32	20.37	18.01	19.13	17.67	17.11	17.76
Min	22.50	18.33	20.50	22.00	21.00	22.00	17.00	13.50	14.50	15.50	14.50	12.00
Max	30.00	44.50	40.00	32.50	36.50	33.50	25.50	21.33	24.67	19.75	19.33	29.00

Permit To Take Water (m3/day)	108.00
Yearly Total (m3)	8,561.31
Yearly Average (m3)	23.42
Yearly Min (m3)	12.00
Yearly Max (m3)	44.50

Table 2 – Treated Water Flow Daily Totals (m3)

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	24.50	26.50	38.50	27.00	24.00	29.67	20.25	15.00	16.25	15.50	16.67	16.67
2	24.50	28.33	38.50	27.00	24.00	29.67	23.00	16.33	16.25	16.50	16.67	17.50
3	27.50	28.33	38.50	22.50	26.67	29.50	17.00	16.33	17.00	16.50	16.67	17.50
4	27.50	28.33	22.50	22.50	26.67	29.50	17.00	16.33	14.00	16.33	14.50	13.50
5	26.33	25.50	22.50	23.00	26.67	23.50	20.33	14.50	14.00	16.33	14.50	13.50
6	26.33	25.50	24.50	23.00	23.00	23.50	20.33	14.50	15.67	16.33	16.50	17.33
7	26.33	24.50	24.50	29.67	23.00	24.67	20.33	13.00	15.67	16.00	16.50	17.33
8	24.00	24.50	25.00	29.67	25.50	24.67	20.00	13.00	15.67	16.00	16.67	17.33
9	24.00	27.00	25.00	29.67	25.50	24.67	20.00	15.33	16.00	17.00	16.67	16.00
10	22.00	27.00	25.00	24.50	27.00	21.50	13.50	15.33	16.00	17.00	16.67	16.00
11	22.00	27.00	25.00	24.50	27.00	21.50	13.50	15.33	17.00	17.75	15.50	17.00
12	27.67	27.50	25.00	27.00	27.00	25.00	16.80	13.00	17.00	17.75	15.50	17.00
13	27.67	27.50	23.00	27.00	23.00	25.00	16.80	13.00	17.67	17.75	14.50	18.00
14	27.67	26.50	23.00	27.00	23.00	25.00	16.80	16.50	17.67	17.75	14.50	18.00
15	26.00	26.50	25.00	24.00	25.50	25.00	16.80	16.50	17.67	15.00	15.33	18.00
16	26.00	16.67	25.00	24.00	25.50	25.00	16.80	15.33	15.00	16.00	15.33	15.00
17	24.50	16.67	25.00	25.00	31.00	27.00	18.00	15.33	15.00	16.00	15.33	15.00
18	24.50	16.67	24.50	25.00	31.00	27.00	18.00	15.33	18.00	17.33	16.50	18.00
19	26.00	43.00	24.50	26.33	31.00	25.50	18.00	14.50	18.00	17.33	16.50	18.00
20	26.00	43.00	24.50	26.33	35.00	25.50	18.00	14.50	20.33	17.33	18.50	14.67
21	26.00	25.00	24.50	26.33	35.00	29.67	18.00	15.00	20.33	14.50	18.50	14.67
22	24.00	25.00	26.00	26.00	28.00	29.67	16.50	15.00	20.33	14.50	18.00	14.67
23	24.00	30.33	26.00	26.00	28.00	29.67	16.50	16.67	15.50	16.00	18.00	20.00
24	25.50	30.33	26.00	25.00	29.00	23.50	17.50	16.67	15.50	16.00	18.00	17.33
25	25.50	30.33	26.50	25.00	29.00	23.50	17.50	16.67	14.50	18.33	15.00	17.33
26	26.00	28.00	26.50	27.67	29.00	27.00	18.00	17.50	14.50	18.33	15.00	17.33
27	26.00	28.00	29.00	27.67	23.50	27.00	18.00	17.50	17.33	18.33	17.00	17.33
28	26.00	38.50	26.50	27.67	23.50	20.25	18.00	13.50	17.33	17.50	17.00	17.33
29	27.00	38.50	26.50	27.00	23.50	20.25	17.00	13.50	17.33	17.50	16.67	17.33
30	27.00	N/A	26.50	27.00	23.50	20.25	17.00	16.25	15.50	13.00	16.67	11.00
31	26.50	N/A	26.50	N/A	29.67	N/A	15.00	16.25	N/A	13.00	N/A	16.67
Total	794.50	810.49	819.50	780.01	832.68	763.11	550.24	473.48	498.00	510.47	489.35	512.32
Average	25.63	27.95	26.44	26.00	26.86	25.44	17.75	15.27	16.60	16.47	16.31	16.53
Min	22.00	16.67	22.50	22.50	23.00	20.25	13.50	13.00	14.00	13.00	14.50	11.00
Max	27.67	43.00	38.50	29.67	35.00	29.67	23.00	17.50	20.33	18.33	18.50	20.00

Municipal Drinking Water License (m3/day)	108.00
Yearly Total (m3)	7,834.15
Yearly Average (m3)	652.85
Yearly Min (m3)	11.00
Yearly Max (m3)	43.00

RAVENSVIEW
WATER POLLUTION CONTROL PLANT

2024 ANNUAL REPORT

TABLE OF CONTENTS

1 EXECUTIVE SUMMARY

Ravensview Water Pollution Control Plant (WPCP) operates under Ministry of the Environment, Conservation and Parks, Environmental Compliance Approval (ECA) number 5556-BZFGZL. The facility was compliant with all conditions outlined in condition 7 of the above-mentioned ECA and are briefly described in the following sections of this report.

The average raw influent flow into the plant was 52,292 m^3/day. The facility had no secondary treatment bypasses in 2024. Operational staff continually improve the operation of Ravensview WPCP to protect the environment and maintain the quality of service Kingston residents have come to know.

2 PLANT DESCRIPTION AND TREATMENT PROCESS

The following is a process overview and description of the treatment steps taken at Ravensview Water Pollution Control Plant

2.1 RAW WASTEWATER RECEIVING

Raw wastewater from the central and east portions of Kingston is conveyed to the influent works. A Parshall flume metering device continuously measures the flow of raw wastewater into the plant. The septage receiving station is located in the northeast corner of the property. The septage receiving station gives approved septic truck haulers a place to discharge the contents of their tanks. The septage receiving station monitors the quantity, and origin, of the contents being unloaded and provides some pre-treatment before the contents enter the treatment plant at the influent works.

2.2 SCREENING

Three large mechanical screens remove larger materials from the incoming wastewater stream. Screened material is conveyed to a screening press where the material is compacted and stored for offsite disposal.

2.3 GRIT REMOVAL

Grit settles out of the sewage as the water flows through the tanks which are covered to keep the odours in. Air is bubbled into the tank to speed up the settling of the sand, gravel, and other heavier, and inorganic materials. In the bottom of the tank, a screw system pushes the settled grit into a hopper at the end of the tank. A pump lifts the grit and a small amount of water up into a separator where the grit is rinsed and then placed into a dumpster where it awaits disposal at a landfill.

2.4 PRIMARY CLARIFIERS

After removing the screenings and grit, the only material left in the wastewater is organic material and dissolved contaminants. The wastewater flows very slowly from one end of the tank to the other. As this happens, the solids, which are high in organic material, settle to the bottom. Large scrapers draw the material to one end of the tank where it is pumped across to the digesters for further processing. At the end of the primary clarifiers, the primary effluent flows into troughs which then direct it to the secondary treatment process. In the primary clarifiers, any grease, fats, or oils that are suspended are skimmed off by rakes and are pumped to the digesters. Any floatable materials that may have slipped through the bars in the screening process will be ground up before entering the digester.

2.5 BIOLOGICAL AERATED FILTERS

The primary effluent flows to a pumping facility which lifts the wastewater up to a channel running along the centre of the Biological Aerated Filters (BAF) facility. In each of the 11 available cells, the

wastewater flows from the central channel to the bottom of the filters, and up through the filter. In the filter the wastewater is aerated, this encourages growth of microorganisms which consume carbon dissolved in the wastewater, as well as reducing ammonia and phosphorus. These microscopic organisms, referred to as biomass, stick onto the Bio Styrene media (4 mm diameter polystyrene beads), which also act to filter any suspended materials. The beads are held in place under a concrete floor with nozzles which let the clean water flow out on the surface. Like other filters, these are backwashed periodically to remove excess biomass growth and filtered particles. This helps to restore the filters' ability to process wastewater efficiently.

2.6 DISINFECTION

Disinfection is accomplished by adding sodium hypochlorite to the BAF facility effluent. The effluent flows by gravity to a chlorine contact chamber where ample time is provided for the chlorine to disinfect the BAF effluent. Just prior to exiting the chlorine contact tank, the wastewater is dosed with sodium bisulphite. This process de-chlorinates the water entering the receiving stream.

2.7 OUTFALL

After de-chlorination, the disinfected effluent from the chlorine contact tanks is discharged to the St. Lawrence River through a 1500 mm diameter outfall sewer with fourteen 250 mm elbow diffusers, approximately 240 m offshore.

2.8 BAF BACKWASH RESIDUAL TREATMENT

As wastewater is filtered through the BAF filter beds, the media becomes increasingly clogged and requires backwashing to remove excess contaminants and biomass. After leaving the BAF cell, the backwash residual water follows the backwash channel to two backwash residual tanks, each large enough to accommodate the volume of backwash residual from a backwash. The water is pumped back to the head of the plant using one of two submersible backwash residual pumps.

2.9 ANAEROBIC DIGESTERS

The digester facility consists of three primary digesters and one secondary digester. Inside, the mixture is heated to allow microorganisms to grow and consume carbon, this produces methane gas and carbon dioxide. The first primary digester, digester 3, is heated to 55 °C (thermophilic), which further assists in the destruction of harmful bacteria in the solids. After approximately 15 days, the solids are transferred in series to two other primary digesters, digesters 1 and 2, which are heated to 36 °C (mesophilic), where they remain for an additional 15 days before being stored in the secondary digester, digester 4, before being sent to the dewatering facility.

Sludge in digesters 1 and 2 is mixed using four mechanical mixers mounted on each of the digester's roofs. The sludge from digesters 1 and 2 is recirculated through two sludge heat exchangers, this helps the digester maintain the correct temperature. Mixing in digester 3 is accomplished using only a mixing pump. The sludge from digester 3 is also recirculated through a heat exchanger to maintain the correct temperature as well. Digester 4 sludge is pumped to holding tanks in the dewatering building where it is recirculated until ready to be dewatered.

The methane gas produced is used as fuel for the boiler system which in turn provides heat for the digestion process through the sludge heat exchangers. If more gas is being generated than can be used in the boiler, the excess gas can be used in a combined heat and power generation system, Co-gen, to help offset the power purchased from the grid, or burned using a flare stack.

2.10 DEWATERING

Liquid biosolids, which are about 2% solid and 98% water, are pumped from the secondary digester into 2 centrifuges. Polymer is added to the biosolids before it enters the centrifuge, this helps the solids stick together, aiding the dewatering process. The centrifuge spins at a high-speed, forcing solids to the outer drum. This separates the solids, referred to as cake, from the liquid, called centrate. The cake, which now has a solids content of about 30%, is conveyed to a hopper. When enough material is in the hopper, a piston pump pushes the solid cake to the biosolids storage building. Alternatively, the cake materials can be loaded directly into a dump truck in a separate loading bay. The centrate, which contains many nutrients and some microorganisms, is returned to the headworks for treatment.

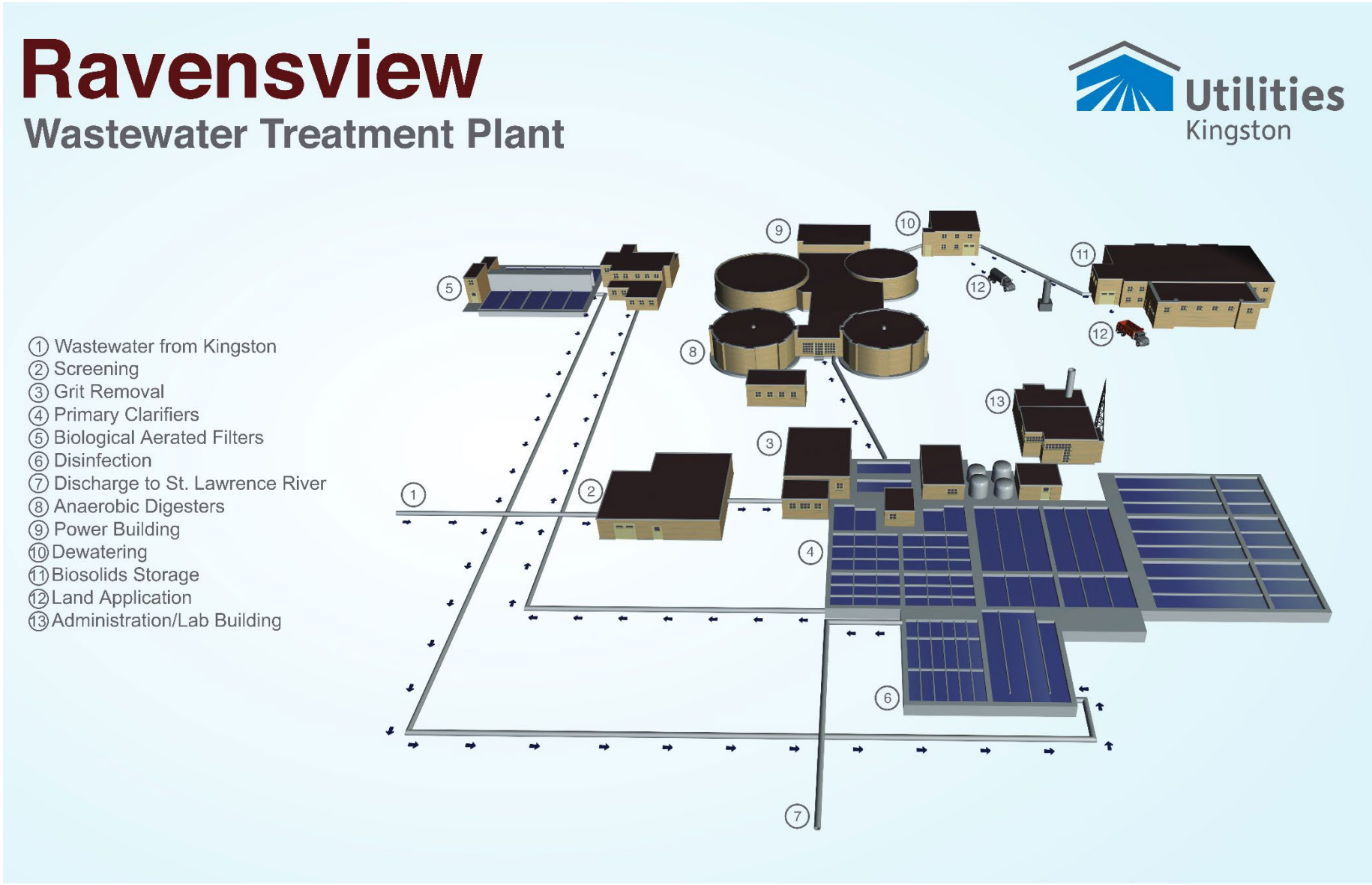
2.11 BIOSOLIDS STORAGE

The dry product, cake, that results from the treatment process is stored on site. The cake is then used on agricultural lands as a nutrient and soil conditioner when weather and crop conditions permit.

2.12 STANDBY EQUIPMENT

The power building houses two 575 Kilowatt (kW) electric back-up generators that are designed to run the water pollution control plant in the event of a power outage. These units are powered by 12-cylinder, low emission natural gas engines that will start automatically in the event of a power failure. The aforementioned Co-gen is a combined heat and power generator. This 8-cylinder engine is designed to work on natural gas, digester gas which has been cleaned and the moisture removed, or a blend of these two fuels. The Co-gen unit is designed to run continuously and produce 375 kW of electric power and 500 kW of heat reducing the amount of gas required to heat the digesters.

Figure 1 - Ravensview Water Pollution Control Plant General Layout



3 OPERATION

Preventative maintenance and regular equipment inspections reduced equipment down time, and allowed operational problems to be diagnosed quickly and corrective actions to be taken immediately. Non flushable materials such as wipes, and grease continue to be more prominent in the sewer system resulting in some operational and maintenance challenges. Utilities Kingston continues to implement a public education program to help customers become more aware of what materials should not be flushed down the sewers. This program has included radio and newspaper campaigns, social media campaigns, bill stuffers, information on back of parking tickets, and bus information signs. This has been an ongoing campaign for many years with positive results. During the summer of 2024 staff educated owners of grease traps on how to properly maintain their equipment. Pamphlets describing the importance of appropriate grease trap maintenance and how it impacts the City's sanitary sewer collection system were delivered to many restaurants across the city.

There were several large operational challenges that occurred through the year.

In June, Digester 3 was put back online following a cleaning, and maintenance overhaul of the digester and associated infrastructure. Following Digester 3 coming online and returning to normal operation, Digester 2 was taken offline for the same cleaning and maintenance overhaul.

Through the fall flows into the plant of raw sewage decreased dramatically because of the dry weather. During this period, the incoming sewage was much more concentrated than expected at that time of year. This led to difficulties treating the sewage, and required adjustments to the treatment process to maintain effluent quality.

4 INFLUENT AND SEPTAGE

Utilities Kingston monitors the raw influent sewage, as well as the imported sewage from the septage receiving station for several parameters throughout the year.

The concentration of the monitored parameters, biochemical oxygen demand (BOD), Total Kjeldahl Nitrogen (TKN), Total Suspended Solids (TSS), and Total Phosphorous (TP), in the sewage being received at the septage station has been increasing over the past several years. These higher concentrations lead to frequent operational challenges, including maintenance on the influent screening equipment, and increased costs associated with treating the wastewater. In the next calendar year staff will increase sampling, and verification of septage loads. This will help ensure the treatment system is not impacted by the increasing concentrations of these parameters.

The concentration of the monitored parameters in the raw sewage has also been increasing over the past several years. Over the past several years, Utilities Kingston has been working towards separating the combined storm/sanitary sewers to reduce stormwater flows into the sewer system, and it's possible that the reduced stormwater in the sanitary system could have an influence on the increased concentrations of these parameters. The average temperature of the sewage being received at the facility is also increasing and could also be an indicator of the reduced stormwater inputs which are typically much colder than the raw sewage.

Annual average sample results for Septage Receiving from the past six years, and the 2024 annual average sample results for Raw Influent are shown in Tables 3 and 4 respectively.

5 PLANT PERFORMANCE

The ECA number 5556-BZFGZL lists the limits and objectives for the concentrations of certain effluent parameters, this is shown in Table 2. The effluent objectives listed in this table are the concentrations Utilities Kingston are expected to be below. The effluent concentration limits listed in the table are the concentrations Utilities Kingston are required to be below. Ravensview WPCP did

not exceed any of the limits set out in the ECA throughout the calendar year. However, the plant did exceed some of the objectives set out in the ECA. There were four samples throughout the year where plant effluent was below the pH objective of 6.50. In the month of November, the monthly average effluent Total Suspended Solids (TSS) exceeded the objective of 15 mg/l. The annual average Final Effluent results can be seen in Table 5 and 6.

Operational staff had difficulty managing seasonally increased raw influent concentrations, but managed the increased concentrations by increasing chemical dosages, taking primary clarifiers offline to increase flow rates through the plant, and taking offline and cleaning several channels and tanks in the system. Final effluent TSS was elevated, however operators were able to maintain a concentration below the monthly average limit of 25 mg/L.

The average daily influent flow for the year was 55% of the rated capacity (95,000 m^3/day) of the facility, this is below the average influent flow rates from the past 8 years. The monthly average chlorine residual in the final effluent did not exceed 0.02 mg/L for any month of the year, and the highest single measurement was 0.02 mg/l. All monthly effluent loading rates were below the limits set out in the ECA, the loading results can be found in Table 7 below. Raw Influent, Septage, Final Effluent, and Sludge/Biosolids samples were collected and submitted to a third-party laboratory at or above the required frequencies based on the ECA.

6 BIO-SOLIDS MANAGEMENT

Ravensview WPCP processed 75,399.44 m^3 of liquid sludge through the centrifuge. Approximately 3,503.91 Metric Tonnes of sludge cake was stored on site until GFL Environmental applied it to land on licensed agricultural fields. A similar amount of sludge cake is expected to be produced next year.

The location and date of land application of the Bio-solids produced largely depends on weather, and the crops being grown on the receiving lands. Table 1 contains active spreading locations and their appropriate Non-Agricultural Source Materials (NASM) Plan.

7 MAINTENANCE

Staff continue to follow a preventative maintenance program in accordance with manufacturer's recommendations.

Additional Maintenance completed this year:

- Infrared scans of high voltage electrical was performed across the plant.
- Equipment and motors had routine vibration monitoring conducted.
- Backwash tanks were cleaned.
- A BAF air compressor was rebuilt.
- BAF blowers had various major work done, including: two cores rebuilt, HMI's were replaced.
- Clarifier influent channels were taken offline, cleaned, and the air lines were inspected and replaced as needed.
- Both Centrifuges had major maintenance performed and refurbished.

8 CAPITAL WORKS

The major highlights for capital works were:

- One of the primary effluent pumps was sent out to be rebuilt.
- Digester 2 Taken offline, cleaned and has routine maintenance completed to associated equipment and piping.

9 EQUIPMENT CALIBRATION

Third party contractors calibrated all plant flow meters, online analyzers, and lab equipment. As a result, the facility saw limited downtime of major equipment and saw very few mechanical or electrical failures this year. Calibration records are available upon request.

10 COMPLAINTS

In the 2024 reporting year, the Ravensview WPCP received four complaints regarding odours from the facility. Influent flows into the facility were quite low and more concentrated during the late summer and fall seasons. During this time the facility received all four of the odour complaints. Efforts were made to clean tanks, and ensure all equipment was operating as it should to help reduce odours coming from the facility.

11 BYPASS & OVERFLOW SUMMARY

The facility had no secondary bypass events during the reporting year. There was an unavoidable planned release of digester gas as part of the maintenance on the digester. Utilities Kingston worked with the MECP to receive approval for the release, and monitored the process closely.

For further information about this report or any questions regarding accessibility, contact Tim Bourne at tbourne@utilitieskingston.com or call 613-546-1181 Ext 2190.

12 BIOSOLIDS RECIPIENTS

Table 1 – Biosolids Recipients

Non-Agricultural Source Materials Plan (NASM)	Address
60616	Lot 29-30 Con 3, Town of Greater Napanee
25097	Lot 7-9 Con 3, Loyalist Township
25196	Lot 8-12 Con 2 South, Town of Greater Napanee
24405	Lot 25-27 Con 4 South, Town of Greater Napanee
24842	Lot 1-3 Con 2, Leeds and the Thousand Islands
61937	Lot 14 Con 6 North, Town of Greater Napanee

13 EFFLUENT OBJECTIVES AND LIMITS

Table 2 – Effluent Objectives and Limits

Effluent Parameter	Objective	Limits
CBOD5	15.00 mg/L (Monthly Average)	25.00 mg/L (Monthly Average)
Total Suspended Solids	15.00 mg/L (Monthly Average)	25.00 mg/L (Monthly Average)
Total Phosphorus	0.8 mg/L (Monthly Average)	1.00 mg/L
Total Ammonia Nitrate (Winter)	12.00 mg/L (October to May)	N/A
Total Ammonia Nitrate (Summer)	7.00 mg/L (June to September)	N/A
Total Ammonia Nitrate (Fall)	5.00 mg/L (July to August)	N/A
E. Coli	100 CFU/100mL	200 CFU/100mL
CBOD5 Monthly Average Daily Effluent Loading	N/A	2,375 kg/d
Total Suspended Solids Monthly Average Daily Effluent Loading	N/A	2,375 kg/d
Total Phosphorous Monthly Average Daily Effluent Loading	N/A	95 kg/d
pH	6.5 - 9.0	6.0 - 9.5 (at all times)

14 SEPTAGE RECEIVING

Table 3 – Septage Receiving

Parameter	2019	2020	2021	2022	2023	2024
BOD5 (mg/L)	204	804	565	790	1476	1072
TP (mg/L)	360	29	22	53	99	30
TKN (mg/L)	7	548	227	299	564	287
TSS (mg/L)	114	1975	1213	995	3658	2334

15 PLANT PERFORMANCE RESULTS

Table 4 – Raw Influent Results

(Monthly Average)

Month	BOD5 (mg/L)	Total Suspended Solids (mg/L)	Total Phosphorus (mg/L)	Total Ammonia Nitrogen (mg/L)	Total Kjeldahl Nitrogen (mg/L)	pH	Temp
January	20	27	1.60	15.34	16.58	7.45	12
February	25	36	2.00	16.98	19.9	7.79	11.6
March	30	37	1.90	17.88	19.85	7.81	13.75
April	36	62	2.20	16.15	19.28	7.72	12.78
May	26	38	1.70	14.68	16.6	7.66	12.46
June	25	52	1.90	15.58	17.13	7.54	13.43
July	31	58	1.90	13.74	16.28	7.48	16.03

Month	BOD5 (mg/L)	Total Suspended Solids (mg/L)	Total Phosphorus (mg/L)	Total Ammonia Nitrogen (mg/L)	Total Kjeldahl Nitrogen (mg/L)	pH	Temp
August	30	58	2.00	15.18	18.38	7.56	14.42
September	40	73	2.50	24.83	25.55	7.59	13.38
October	59	73	2.90	29.7	30.48	7.54	14.14
November	51	72	3.30	28.73	30.9	7.71	13.63
December	33	63	2.70	17.68	23.83	7.49	12.88
Annual Average	34	54	2.22	18.87	21.23	7.61	13.38

Table 5 – Final Effluent Results (Part 1)

(Monthly Average)

Month	CBOD5 (mg/L)	Total Suspended Solids (mg/L)	Total Phosphorus (mg/L)	Total Ammonia Nitrogen (mg/L)	Un-ionized Ammonia (mg/L)
January	2.00	5.00	0.37	1.99	0.01
February	3.00	4.40	0.54	2.3	0.01
March	2.10	5.20	0.72	2.83	0.01
April	1.90	4.80	0.68	1.89	0.01
May	1.80	4.60	0.48	1.68	0.01
June	3.00	2.80	0.66	1.03	0.01
July	1.70	6.70	0.76	0.97	0.01
August	3.00	5.20	0.50	1.7	0.01
September	1.80	7.60	0.60	5.53	0.01
October	2.30	14.10	0.67	3.77	0.01
November	3.20	22.60	0.69	5.57	0.02
December	2.60	7.70	0.50	3.07	0.02
Annual Average	2.37	7.56	0.60	2.69	0.01

Table 6 – Final Effluent Results (Part 2)

Month	pH	Temperature (°C)	E Coli (CFU/100mL)	Acute Lethality (Pass or Fail)	Total Residual Chlorine (mg/L)
January	6.79	14.59	9	PASS	0.01
February	6.90	14.36	4	N/A	0.01
March	6.85	15.23	2	N/A	0.01
April	6.88	16.21	15	PASS	0.01
May	6.89	17.16	3	N/A	0.01
June	6.77	19.05	32	N/A	0.01
July	6.75	20.47	23	PASS	0.02
August	6.80	19.79	10	N/A	0.01
September	6.81	20	9	N/A	0.01
October	6.75	18.84	2	PASS	0.01
November	6.79	17.66	3	N/A	0.01
December	6.89	16.02	2	N/A	0.01
Annual Average	6.82	17.45	9.50	PASS	0.01

Table 7 – Effluent Loading Limits

Month	CBOD5 (kg/d)	Total Suspended Solids (kg/d)	Total Phosphorous (kg/d)
January	130	325	24
February	179	263	32
March	123	305	42

Month	CBOD5 (kg/d)	Total Suspended Solids (kg/d)	Total Phosphorous (kg/d)
April	128	322	46
May	96	246	26
June	159	148	35
July	92	362	41
August	153	265	26
September	84	355	28
October	85	524	25
November	122	864	26
December	113	335	22
Annual Average	**122**	**360**	**31**

Table 8 – Monthly Plant Influent Flows

Month	Rated Capacity Average Daily Flow (m3/day)	Average Daily Flow (m3/day)	Approved Peak Daily Flow (m3/day)	Peak Daily Flow (m3/day)
January	95,000	64,905	193,000	114,856
February	95,000	59,755	193,000	76,527
March	95,000	58,654	193,000	80,716
April	95,000	67,125	193,000	129,380
May	95,000	53,454	193,000	66,670
June	95,000	52,938	193,000	70,103
July	95,000	54,048	193,000	93,723
August	95,000	51,016	193,000	97,517
September	95,000	46,665	193,000	87,821
October	95,000	37,155	193,000	42,640
November	95,000	38,245	193,000	58,844
December	95,000	43,541	193,000	61,103
Annual Average	N/A	52,292	N/A	81,658

Table 9 – Annual Plant Influent Flows

Parameter	2018	2019	2020	2021	2022	2023	2024
Average (m3/day)	69,005	77,265	59,435	57,278	68,505	61,303	52,292
Max (m3/day)	181,067	160,459	141,016	146,486	153,434	148,549	129,380
Design (m3/day)	95,000	95,000	95,000	95,000	95,000	95,000	95,000
Design Peak (m3/day)	193,000	193,000	193,000	193,000	193,000	193,000	193,000
Daily/Design (%)	72.6	81.3	62.6	60.3	72.1	64.5	55.0
Max/Peak (%)	93.8	83.1	73.1	75.9	79.5	77.0	67.0

Utilities Kingston

CATARAQUI BAY
WATER POLLUTION CONTROL PLANT
2024 ANNUAL REPORT

TABLE OF CONTENTS

1 EXECUTIVE SUMMARY

During 2024, the facility was compliant with all but one of the conditions outlined in condition 7 of Environmental Compliance Approval (ECA) number 2497-CYPPUP. The non-compliant month and effluent parameter is described in the following sections of this report.

The average daily flow through the plant was 25,890 m3/day.

There were no bypass events at Cataraqui Bay. There were three spills to the environment of digester gas, due to pilot light issues with flare stack.

Upgrades to the treatment facility are now considered to be complete and the facility is operating under the new ECA listed above. Planned and reactive maintenance as well as capital works at both the facility and within the collection system were undertaken in 2024. Details regarding these improvements are in the report.

2 PLANT DESCRIPTION AND TREATMENT PROCESS

The following is a process overview and description of the treatment steps taken at the Cataraqui Bay Water Pollution Control Plant (WPCP).

2.1 SCREENING

The first step in the treatment process is screening, where large particles and floating debris such as wood, rags and plastics are removed from the raw wastewater. There are two active 6 mm diameter perforated plate fine screens each in a 2 m wide channel. Screenings are conveyed to a common wash/compactor prior to being discharged in a screening disposal bin. A coarse bar screen is located in a third manual bypass channel, as well as a fourth channel containing an overflow weir (hydraulic bypass of the screens) for emergency purposes only.

2.2 GRIT REMOVAL

The second step of preliminary treatment is grit removal. During this process, heavier solids in the wastewater settle, while the organics that require treatment stay in suspension and move on to the next step of the treatment process. The system is made up of two vortex grit removal tanks equipped with a paddle mixer, and a slurry pump in each tank. The grit is pumped to two grit classifiers used to de-water the grit slurry and discharge the grit into grit disposal bins.

2.3 PRIMARY TREATMENT CHEMICAL FEED

Immediately after the grit vortex tanks, the coagulant Ferric Chloride is added to the stream of wastewater. Chemically assisted coagulation is used to improve the removal of Phosphorous and Suspended Solids in the wastewater. Two chemical storage tanks feed two chemical feed pumps used to dose Ferric Chloride paced to the flow of liquid.

2.4 FLOW SPLITTING

The screened and de-gritted wastewater discharges into a channel where the flow is divided into two parshall flume flow meter channels. The flow is then split into a primary inlet channel leading to four identical primary clarifiers. Centrifugal blowers provide aeration to the primary influent channel to prevent settling in the channels.

2.5 PRIMARY CLARIFIERS

Four primary clarifiers make up the primary treatment system. Heavier organics settle by gravity to the bottom of the primary clarifiers. This forms a sludge blanket on the bottom of the tank. The settled sludge is collected by collector flights and scraped into a hopper at the end of the tank.

Floating scum and grease is removed by surface skimmers located near the end of each clarifier. The settled sludge, and scum and grease, is then pumped to digestion facilities for further treatment.

2.6 BIOLOGICAL AERATED FILTERS

Primary effluent flows down a channel to a Primary Effluent Pumping Station (PEPS) composed of two wet wells and four submersible pumps. Primary effluent is pumped to the Biological Aerated Filter (BAF) Influent Channel. A supplemental alkalinity feed system is required to ensure adequate nitrification while maintaining an acceptable pH in the BAF effluent water. The alkalinity feed system is made up of four storage tanks, and two chemical feed pumps, and is dosed just after the discharge from the PEPS. The BAF is made up of six available cells with a common influent channel which then runs down to the bottom of each cell and filters upwards through two unique sets of media. The two types of media are: polystyrene beads, and K5 hard plastic honeycomb disks. The media is held in place below the top deck of the filter with nozzles which let filtered water out and hold the floating media in. In the filter the wastewater is aerated, this encourages growth of microorganisms which consume carbon dissolved in the wastewater, as well as reducing ammonia and phosphorus. The media is meant to provide a location for microorganisms, referred to as biomass, to grow, the media also helps to filter any suspended materials.

2.7 BACKWASH

The Biological Aerated Filters require regular backwashes to remove excess biomass from the media. Backwash residuals from the filters flows into two backwash residual tanks for temporary storage of the backwash water. The facility has the option to either co-thicken the backwash residuals by adding the backwash water to the primary inlet channel, or to feed the backwash residuals to two gravity thickeners. Alum is added to the backwash water as it is pumped out of the backwash residual tanks. The gravity thickeners are two clarifiers designed to allow solids to settle out and allow the supernatant to flow back and mix with the primary effluent ahead of the primary effluent pumping station. The solids from the gravity thickeners are pumped to a sludge thickening facility. The sludge thickening facility consists of two rectangular holding tanks, two Rotating Drum Thickeners (RDT's), and a polymer system. The thickening system increases the solids concentration of the residuals prior to being pumped to the primary digester. The filtrate from the RDT's is pumped back to the primary inlet channel.

2.8 DISINFECTION

Effluent from the BAF facility flows through a parshall flume to calculate the flow of water into the chlorine contact tank. A chlorine gas system provides chlorine for disinfection prior to entering the chlorine contact tank. The chlorine system is composed of two sets of large and small chlorinators dosing a chlorinated water solution to the BAF effluent stream. Two chlorine contact tanks provide contact time to adequately disinfect the effluent water.

2.9 DECHLORINATION SYSTEM

An effluent dechlorination system using Calcium Thiosulphate removes chlorine from the water prior to discharge into Lake Ontario. The system is made up of two metering pumps, and one chemical storage tank. The Calcium Thiosulphate is dosed into the effluent in the outfall chamber immediately after the final effluent flow meter.

2.10 OUTFALL

After de-chlorination, the disinfected effluent from the chlorine contact tank is discharged back to Lake Ontario through a 1500 mm and a 900 mm outfall. 17 diffusers are installed at the end of each of the outfall pipes and are located 25 m offshore and 16 m below water surface level.

2.11 SLUDGE DIGESTION

Raw sludge, grease and scum, and thickened backwash residuals are pumped to the primary digester in regular intervals throughout the day. The sludge digestion facilities are composed of two anaerobic digesters with an interconnected digester gas system, one digested sludge holding tank, transfer, and mixing pumps, and a heat exchanger. The digesters use recirculated digester gas and sludge piping for mixing. The anaerobic digestion process produces gas and biosolids. The gas produced is rich in methane, which is used as fuel for the boiler system which in turn provides heat for the digestion process, and buildings within the facility. The biosolids produced through sludge digestion are dewatered and used on agricultural lands as a nutrient and soil conditioner when weather and crop conditions permit.

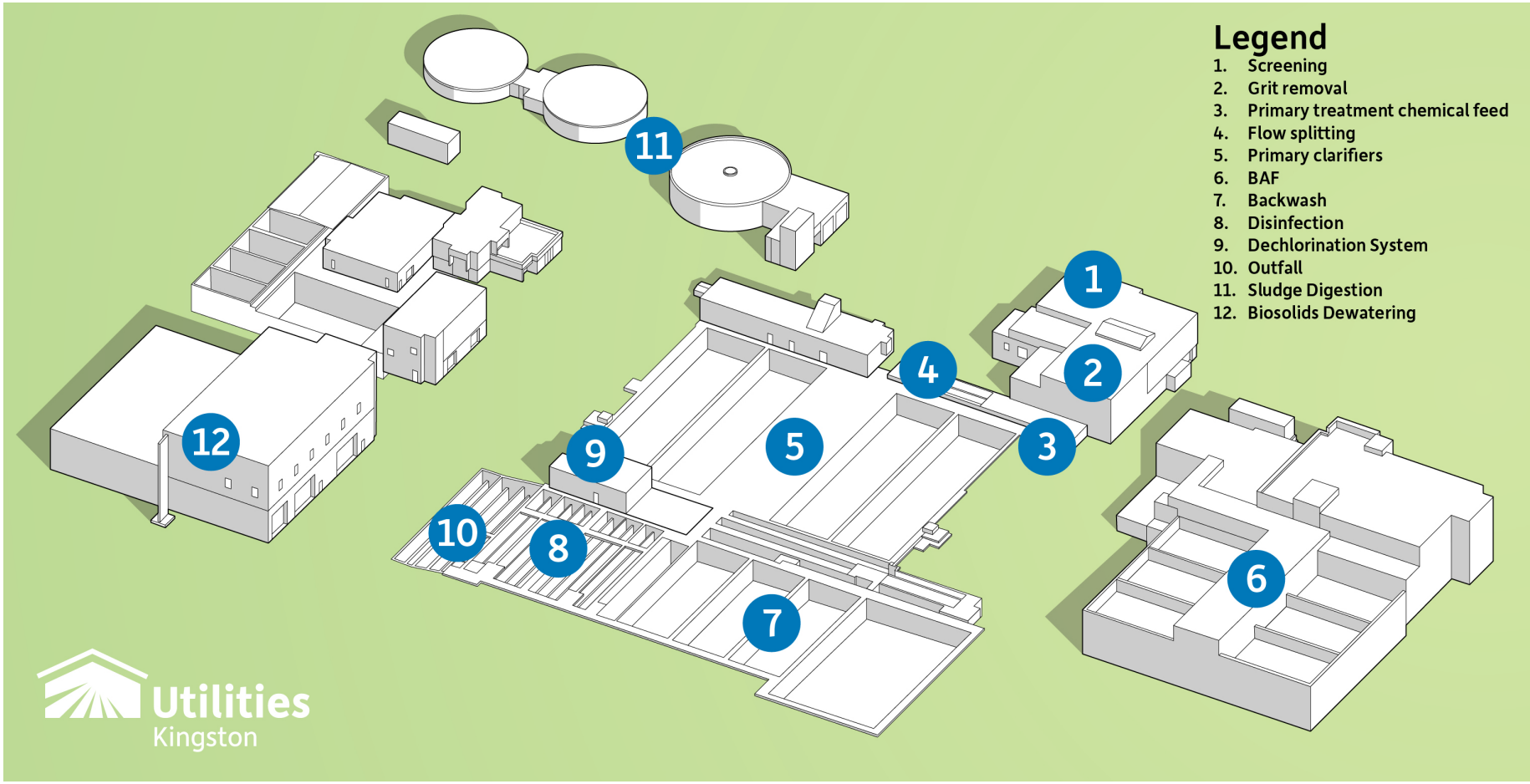
2.12 BIOSOLIDS DEWATERING

The dewatering facility is made up of two sludge feed pumps, a polymer preparation and feed system, two centrifuges with a capacity of dewatering 50 m^3/hour, two screw conveyors, two biosolids storage bunkers, a centrate pumping station, two centrate equalization tanks with two centrate pumps. Liquid biosolids, which are about 1.5-2% solids, are pumped from the holding tank into 2 centrifuges. Polymer is added to the biosolids before it enters the centrifuge, this helps the solids stick together, aiding the dewatering process. The centrifuge spins at a high-speed, forcing solids to the outer drum. This separates the solids, referred to as cake, from the liquid, called centrate. The cake, which now has a solids content of about 24%, is conveyed to a shoot and dropped into the storage bunkers. The centrate, which contains many nutrients and some microorganisms, is returned to the headworks for treatment.

2.13 MISCELLANEOUS

The Cataraqui Bay WPCP has miscellaneous infrastructure required to support continued effective treatment of incoming Wastewater. This includes many controls, electrical power equipment, instrumentation, boilers, and emergency power generation for the entire facility.

Figure 1 – Cataraqui Bay Water Pollution Control Plant General Layout



3 OPERATION

Adequate staffing as well as preventative maintenance, and regular equipment inspections resulted in minimal disruptions to the operation of the plant. Non flushable materials such as wipes, and grease continue to be more prominent in the sewer system resulting in some operational and maintenance challenges. Utilities Kingston continues to implement a public education program to make customers more aware of what materials should not be flushed down the sewers. This program has included radio and newspaper campaigns, social media campaigns, bill stuffers, information on back of parking tickets, and bus information signs. This has been an ongoing campaign for many years with positive results. During the summer of 2024, staff educated owners of grease traps on how to properly maintain their equipment. Pamphlets describing the importance of appropriate grease trap maintenance and how it impacts the City's sanitary sewer collection system were delivered to many restaurants across the city.

A new pilot headworks polymer system was brought online in 2024, see Figure 2 for the Notice of Modification to Sewage Works. This polymer system was implemented as a response to the operational difficulties and increased effluent concentrations in 2023. The system has been online since May 2024, and staff have noted improved effluent concentrations during this time. Laboratory data and observations have been monitored closely during this trial period. A decision on whether or not to implement a permanent polymer system is expected to be made in 2025.

The facility began co-thickening the backwash residuals, and shut down the gravity thickeners and backwash thickening process during 2024. These changes coupled with the headworks polymer trial have shown some success and the effluent concentrations have been reduced compared to the 2023 effluent results.

The Calcium Thiosulphate (Captor) line to the final effluent dose location was replaced to eliminate the problems with scale buildup and the labour intensive cleaning schedule required to keep the line in service.

There was a significant release of an unknown substance in the collection system in November that was extremely alkaline. This release led to a reduced capacity to biologically treat the wastewater coming into the plant. The source of the release or details of what the release remain unknown at the time of preparing this report.

4 PLANT PERFORMANCE

The ECA number 2497-CYPPUP lists the limits and objectives for the concentrations of certain effluent parameters, this is shown in Table 2. The effluent objectives listed in this table are the concentrations Utilities Kingston are expected to be below. The effluent concentration limits listed in the table are the concentrations Utilities Kingston are required to be below. As a result of the above mentioned extreme alkaline discharge into the system, the Cataraqui Bay WPCP had one non-compliant monthly average result for Total Ammonia Nitrogen of 14.79 mg/L, with the monthly average effluent concentration above the limit of 8.0 mg/L. This occurred in the month of November. This non-compliant result was reported to the MECP. Operations staff brought the plant back up to full treatment capacity, and by early December nitrification (a biological process that converts ammonia into nitrate) was back to normal. This incident led to several monthly average concentrations of cBOD, and TSS, and an effluent pH reading, being higher than the objectives set out in the ECA. The 2024 monthly average effluent monitoring results can be found on Tables 4 and 5.

In the month of February, the monthly average Effluent Total Phosphorous (TP) concentration was above the objective while remaining below the limit.

The chlorine residual in the final effluent did not exceed the monthly average limit of 0.04 mg/L for any month of the year. No other parameters were above their limit or objective.

The treatment process is monitored through in-house laboratory work on a regular basis throughout each week.

The concentration of raw influent into the plant remains consistent throughout the year, however during the wet seasons concentrations are somewhat reduced. This increase indicates some infiltration of ground water, or potentially illegal sump pump connections to the sanitary collection system. Annual raw influent monitoring results can be seen in Table 3. Raw Influent, and Final Effluent samples were collected and submitted to a third-party laboratory at or above the required frequencies based on the ECA. The average daily flow into the treatment plant was 47.1% of the design capacity (55,000 m3/day). The new plant has a much higher flow design capacity which is reflected in Table 8. Table 8 shows the average annual plant flows for the past 7 years. The monthly flows as well as the peak daily flow from each month are displayed in Table 6.

5 BIO-SOLIDS MANAGEMENT

Cataraqui Bay WPCP processed 56,294.70 m^3 of liquid sludge through the centrifuge. Approximately 3,541.69 Metric Tonnes of sludge cake was stored on site until GFL Environmental applied it to land on licensed agricultural fields.

The location and date of land application of the bio-solids produced largely depends on weather, and the crops being grown on the receiving lands. Table 1 contains the Non-Agricultural Source Materials (NASM) Plan numbers and addresses of receiving lands for bio-solids produced by the City of Kingston.

6 MAINTENANCE

Staff continue to follow a preventative maintenance program in accordance with the manufacturer's recommendations.

Additional Maintenance completed this year:

- Infrared scans of HV electrical were performed across the plant.
- Equipment and motors had routine vibration monitoring conducted.
- The onsite diesel generator was serviced and received routine maintenance.
- BAF Aeration Blower motor was rebuilt.
- Primary Clarifier 4 cross collector gear box rebuilt.
- Digester gas compressor rebuilt.
- Screen brush motor replaced.

7 CAPITAL WORKS

In October 2016 work began on plant wide upgrades. The original proposed project completion timeline was 4 years (2016 - 2020). In 2024 the Cataraqui Bay WPCP project came to an end and the new plant is now fully operational.

Additional capital works on the Cataraqui Bay WPCP include:

- Chlorine analyzers were completely replaced.
- Landscaping around the facility was completed as part of the plant upgrade.
- Digester gas pipework leading to the flare stack was replaced.

8 EQUIPMENT CALIBRATIONS

Third party contractors calibrated all plant flow meters, online analyzers, and lab equipment. As a result, the facility saw limited downtime of major equipment and saw very few mechanical or electrical failures this year. Calibration records are available upon request.

9 COMPLAINTS

In the 2024 reporting year, the Cataraqui Bay WPCP received no official complaints regarding the facility or treatment process.

10 BYPASS AND SPILL SUMMARY

There were no bypasses at the Cataraqui Bay WPCP in 2024.

There were three spill events of un-combusted digester gas to the environment, totaling 853 m^3 that were reported to the MECP in the 2024 reporting year. These spills occurred when the pilot light of the flare stack blew out in high winds. The primary boilers use digester gas to heat the facility, and any extra gas is sent to the flare stack. During these periods where the flare was not lit, any digester gas being sent to the flare was not burnt. The release of unburnt digester gas is considered a spill to the environment. Contractors were hired to assess the flare stack and make adjustments to strengthen the pilot flame. This stronger pilot flame, coupled with modifications to operating procedures, are expected to reduce the frequency of these spills due to the pilot light being blown out.

11 BYPASS RESULT INTERPRETATIONS

As noted above there were no bypasses at the Cataraqui Bay WPCP in 2024. However, it should be noted that bypass discharges have a high bacteria count due to the lack of disinfection. $CBOD_5$, TP, and TSS results are typical raw sewage influent levels. When bypasses occur, best efforts are made to capture the debris contained in any discharges to the lake. After each bypass event, shoreline inspections near discharge points are done to monitor any debris that may come ashore, and clean-up is done if debris is found.

For further information about this report or any questions regarding accessibility, contact Tim Bourne at tbourne@utilitieskingston.com or call 613-546-1181 Ext 2190.

12 BIOSOLIDS RECIPIENTS

Table 1 – Biosolids Recipients

Non-Agricultural Source Materials (NASM) Plan	Address
24327	Lot 12 Con 1 South, Town of Greater Napanee
60616	Lot 29-30 Con 3, Town of Greater Napanee
60616	Lot 5-7 Con 1 South, Town of Greater Napanee
25097	Lot 7-9 Con 3, Loyalist Township
60616	Lot 11, 14-15 Con 2 North, Town of Greater Napanee
61937	Lot 14 Con 6 North, Town of Greater Napanee

13 EFFLUENT OBJECTIVES AND LIMITS

Table 2 – Effluent Objectives and Limits

Effluent Parameter	Objective	Limits
CBOD5	15.00 mg/L (Monthly Average)	25.00 mg/L (Monthly Average)
Total Suspended Solids	15.00 mg/L (Monthly Average)	25.00 mg/L (Monthly Average)
Total Phosphorus	0.80 mg/L (Monthly Average)	1.00 mg/L (Monthly Average)
Total Ammonia Nitrogen (TAN) Summer (Jun 1 to Nov 30) Winter (Dec 1 - May 31)	6.0 12.0	8.0 15.0
Total Chorine Residual	Non Detectable	0.04 mg/L
E. Coli	100 CFU/100mL	200 CFU/100mL
pH	6.5 - 8.5	6.0 - 9.0

14 PLANT PERFORMANCE RESULTS

Table 3 – Raw Influent Results

(Monthly Average)

Month	BOD5 (mg/L)	Total Suspended Solids (mg/L)	Total Phosphorus (mg/L)	Total Ammonia Nitrogen (mg/L)	Total Kjeldahl Nitrogen (mg/L)	pH
January	198.00	118.00	3.00	18.25	30.78	7.54
February	170.00	156.00	3.30	17.25	32.15	7.41
March	162.00	162.00	3.30	19.7	34.63	7.36
April	177.00	135.00	3.00	17.93	31.08	7.4
May	193.00	153.00	3.50	20.82	33.32	7.28
June	207.00	184.00	3.50	23.2	35.9	7.13
July	223.00	234.00	4.40	26.44	40.38	7.26
August	218.00	207.00	4.20	23.1	37.55	7.37
September	186.00	237.00	4.10	25	38.53	7.3
October	221.00	323.00	5.10	26.94	48.24	7.34
November	228.00	218.00	4.80	34.5	48.68	7.4
December	192.00	182.00	3.70	24.65	40.43	7.34
Annual Average	197.92	192.42	3.83	23.15	37.64	7.34

Table 4 – Monthly Effluent Concentrations (Part 1)

(Monthly Average)

Month	CBOD5 (mg/L)	Total Suspended Solids (mg/L)	Total Phosphorous (mg/L)	Total Ammonia (mg/L)	Total Kjeldahl Nitrogen (mg/L)
January	5.10	9.30	0.22	5.21	8.13
February	5.30	10.50	0.83	3.53	5.98
March	2.50	7.40	0.42	1.20	3.13
April	3.60	7.10	0.47	1.56	3.73
May	2.60	5.30	0.63	1.90	3.52
June	2.80	3.80	0.50	0.99	2.73
July	5.40	12.60	0.55	2.24	4.34
August	3.40	8.40	0.58	1.82	3.63
September	3.60	8.80	0.56	5.46	7.13
October	3.60	10.20	0.75	5.09	7.02
November	21.50	22.30	0.52	14.79	27.25
December	4.00	8.50	0.38	4.78	7.58
Annual Average	5.28	9.52	0.53	4.05	7.01

Table 5 – Monthly Effluent Concentrations (Part 2)

Month	Nitrate	Nitrite	E. Coli	pH	Total Residual Chlorine (mg/L)	Acute Lethality (Pass or Fail)
January	15.95	0.16	12	7.44	0.01	PASS
February	17.13	0.29	12	7.30	0.01	N/A
March	18.43	0.55	6	7.24	0.01	N/A
April	17.60	0.55	2	7.30	0.01	PASS
May	19.68	0.25	11	7.29	0.01	N/A
June	23.35	0.36	7	7.27	0.02	N/A
July	21.94	0.41	38	7.25	0.01	PASS
August	23.45	0.54	10	7.32	0.01	N/A
September	19.40	0.94	16	7.45	0.01	N/A
October	25.06	0.59	3	7.48	0.01	PASS
November	20.16	0.47	28	7.38	0.01	N/A
December	19.48	0.28	6	7.23	0.01	N/A
Annual Average	20.14	0.45	13	7.33	0.01	N/A

Table 6 – Monthly Flows

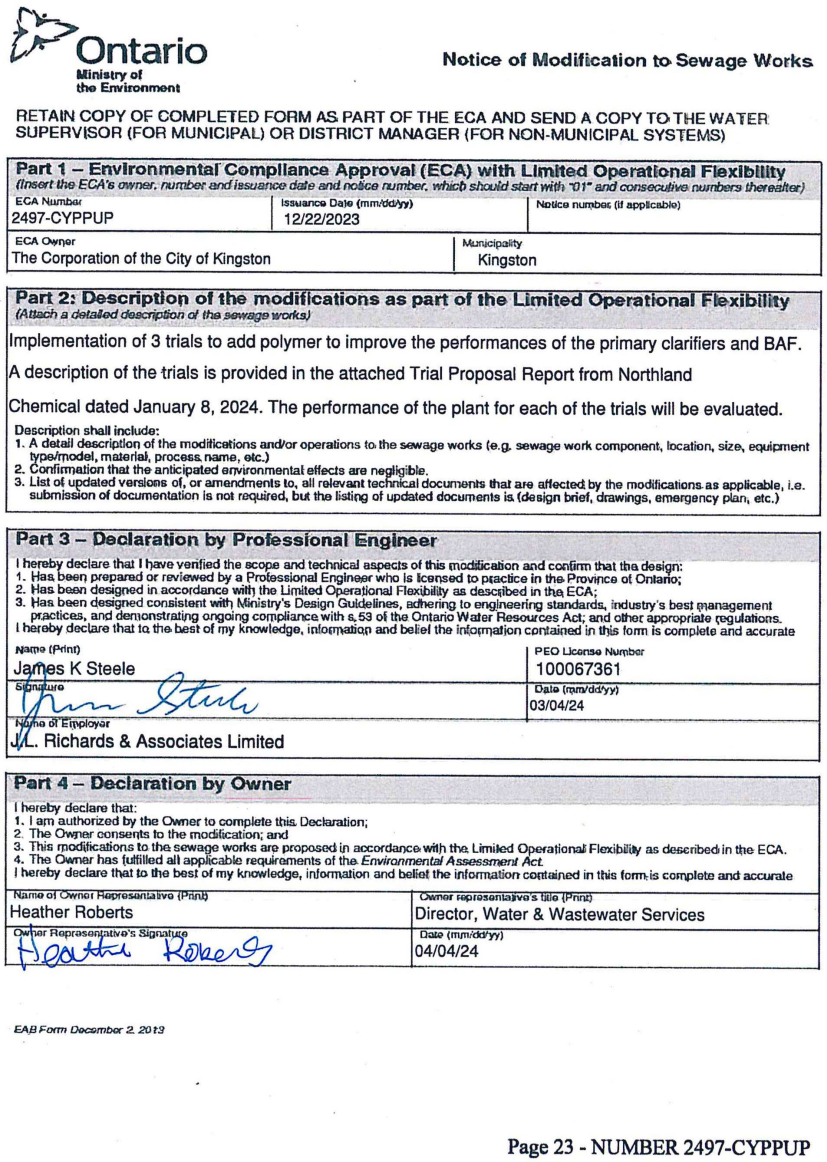
Month	Rated Capacity (m3/day)	Average Flow (m3/day)	Approved Peak Flow (m3/day)	Peak Flow (m3/day)
January	55,000	35,954	141,600	66,770
February	55,000	30,439	141,600	39,540
March	55,000	30,171	141,600	43,332
April	55,000	34,946	141,600	80,178
May	55,000	24,235	141,600	31,609
June	55,000	24,325	141,600	32,445
July	55,000	24,245	141,600	43,923
August	55,000	22,316	141,600	33,959
September	55,000	21,851	141,600	44,008
October	55,000	18,547	141,600	21,428
November	55,000	19,202	141,600	26,027
December	55,000	24,448	141,600	36,097
Annual Average	N/A	25,890	N/A	41,610

Table 7 – Annual Plant Flows

Parameter	2018	2019	2020	2021	2022	2023	2024
Average (m3/day)	28,963	29,251	27,189	27,225	29,381	28,707	25,890
Max (m3/day)	94,957	91,976	82,297	51,566	88,225	108,514	80,178
Design (m3/day)	38,800	38,800	38,800	38,800	38,800	38,800	55,000
Design Peak (m3/day)	134,400	134,400	134,400	134,400	134,400	134,400	141,600
Daily/Design (%)	74.6	75.4	70.1	70.2	75.7	74.0	47.1
Max/Peak (%)	70.7	68.4	61.2	38.4	65.6	80.7	56.6

15 NOTICE OF MODIFICATIONS TO SEWAGE WORKS

Figure 2 – Notice of Modification to Sewage Works



Ontario
Ministry of the Environment

Notice of Modification to Sewage Works

RETAIN COPY OF COMPLETED FORM AS PART OF THE ECA AND SEND A COPY TO THE WATER SUPERVISOR (FOR MUNICIPAL) OR DISTRICT MANAGER (FOR NON-MUNICIPAL SYSTEMS)

Part 1 – Environmental Compliance Approval (ECA) with Limited Operational Flexibility
(Insert the ECA's owner, number and issuance date and notice number, which should start with "01" and consecutive numbers thereafter)

ECA Number	Issuance Date (mm/dd/yy)	Notice number (if applicable)
2497-CYPPUP	12/22/2023	

ECA Owner	Municipality
The Corporation of the City of Kingston	Kingston

Part 2: Description of the modifications as part of the Limited Operational Flexibility
(Attach a detailed description of the sewage works)

Implementation of 3 trials to add polymer to improve the performances of the primary clarifiers and BAF.

A description of the trials is provided in the attached Trial Proposal Report from Northland

Chemical dated January 8, 2024. The performance of the plant for each of the trials will be evaluated.

Description shall include:
1. A detail description of the modifications and/or operations to the sewage works (e.g. sewage work component, location, size, equipment type/model, material, process name, etc.)
2. Confirmation that the anticipated environmental effects are negligible.
3. List of updated versions of, or amendments to, all relevant technical documents that are affected by the modifications as applicable, i.e. submission of documentation is not required, but the listing of updated documents is (design brief, drawings, emergency plan, etc.)

Part 3 – Declaration by Professional Engineer

I hereby declare that I have verified the scope and technical aspects of this modification and confirm that the design:
1. Has been prepared or reviewed by a Professional Engineer who is licensed to practice in the Province of Ontario;
2. Has been designed in accordance with the Limited Operational Flexibility as described in the ECA;
3. Has been designed consistent with Ministry's Design Guidelines, adhering to engineering standards, industry's best management practices, and demonstrating ongoing compliance with s.53 of the Ontario Water Resources Act; and other appropriate regulations.

I hereby declare that to the best of my knowledge, information and belief the information contained in this form is complete and accurate

Name (Print)	PEO License Number
James K Steele	100067361
Signature	Date (mm/dd/yy)
	03/04/24
Name of Employer	
J.L. Richards & Associates Limited	

Part 4 – Declaration by Owner

I hereby declare that:
1. I am authorized by the Owner to complete this Declaration;
2. The Owner consents to the modification; and
3. This modifications to the sewage works are proposed in accordance with the Limited Operational Flexibility as described in the ECA.
4. The Owner has fulfilled all applicable requirements of the *Environmental Assessment Act*.

I hereby declare that to the best of my knowledge, information and belief the information contained in this form is complete and accurate

Name of Owner Representative (Print)	Owner representative's title (Print)
Heather Roberts	Director, Water & Wastewater Services
Owner Representative's Signature	Date (mm/dd/yy)
	04/04/24

EAB Form December 2, 2013

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Utilities Kingston

CANA WASTEWATER TREATMENT PLANT

2024 ANNUAL REPORT

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1 EXECUTIVE SUMMARY

Cana Water Pollution Control Plant (WPCP) operates under Ministry of the Environment, Conservation and Parks, Environmental Compliance Approval (ECA) number 4021-9WUKDE. The facility exceeded one of the effluent limits outlined in condition 7 of the above-mentioned ECA during 2024.

The sewage works has a rated capacity of 125 m^3/d, and a maximum day design flow of 200 m^3/d. The average flow through the plant was 57.7 m^3/d, and the maximum daily flow through the plant was 116 m^3/d in 2024.

2 PLANT OVERVIEW

The following is a process overview and description of the treatment steps taken at the Cana WPCP.

2.1 RAW SEWAGE PUMPING STATION

A pre-cast concrete wet well accepts sewage flows from the existing sewer system for the Cana Subdivision. The wet well has two pumps which discharge into the preliminary treatment unit.

2.2 PRELIMINARY TREATMENT UNIT

Preliminary treatment involves the removal of large particles and floating debris such as wood, rags, and plastics from the raw sewage. This is accomplished with a manual bar screen installed inside a splitter box.

2.3 SECONDARY TREATMENT UNIT

The sewage flows through the splitter box and bar screen, it then discharges into the two Sequencing Batch Reactors (SBR). Each reactor is essentially an activated sludge process with aeration and settling taking place in the same tank. The decanted effluent from the SBR is then stabilized in a Post Equalization Tank. The sludge that settles out in the SBR is then pumped directly to the Digester.

2.4 POST EQUALIZATION TANK

The Post Equalization Tank collects the decanted water from the Sequencing Batch Reactors and discharges to the tertiary filter system.

2.5 CHEMICAL DOSING SYSTEMS

Phosphorus removal is accomplished using Aluminum Sulfate, which is injected directly into the splitter box during pump cycles.

2.6 TERTIARY FILTRATION UNIT

The discharge of the post equalization tanks goes into a continuous backwash up-flow sand filter to polish the water before going through the ultraviolet disinfection system. Filtrate then passes through one of the two Ultraviolet (UV) disinfection units.

2.7 UV DISINFECTION

The filtrate then passes through one of the two UV disinfection units. Each unit can handle the maximum flow of 200 m^3/day.

2.8 OUTFALL

The treated effluent from the plant is discharged into a 27.9 m long pipe into an existing creek which flows into Colonel By Lake.

2.9 BUILDING AND CONTROL ROOM

There is one building that houses the tertiary filtration unit, chemical dosing systems, blowers, and all associated electrical equipment.

2.10 DIGESTER UNIT

The waste sludge generated from the SBRs is pumped into the digester for stabilization and storage. The digester supernatant is returned to the influent manhole, and the sludge is hauled as required to Ravensview WPCP in the City of Kingston for further treatment.

2.11 STANDBY EQUIPMENT

A diesel generator on the property of the Cana WPCP provides backup electrical supply in case of power outages. This generator is directly connected to both the Cana Water and Cana Wastewater facilities and is capable of fully powering both systems in the event of a power outage.

3 MONITORING DATA

All required samples were collected and sent to a third-party laboratory for testing. The semiannual upstream surface water monitoring sample could not be collected in October due to a lack of flow in the existing water course. The downstream sample was collected in October, and both the upstream and downstream samples were collected in April and the results are shown in Tables 5 and 6.

Monthly plant flows can be found in Table 10. Flows into all of the WPCP's being operated by Utilities Kingston were low through 2024. These low flows most likely are a result of the very low amounts of rainfall through the end of the summer and fall. Efforts were made to remove illegal connections in 2020, this resulted in a noticeable improvement in the flows into the plant. Annual average flow data for the past six years is in Table 9. Data over the past several years indicate that an unknown input into the system has been increasing flows during rain events, this could be a result of infiltration in the collection system, or illegal sump pump, or roof leader connections. In another effort to reduce these elevated flows during rain events, letters describing the increased flows the plant is experiencing, the problems associated with those increased flows, and the bylaw requirements for residents were delivered to all houses connected to the system in October 2024.

Raw influent laboratory results (Table 2) were monitored throughout the year and were used to help make operational decisions throughout the year.

The ECA number 4021-9WUKDE lists the limits and objectives for the concentrations of certain effluent parameters, this is shown in Table 1. The effluent objectives listed in this table are the concentrations Utilities Kingston is expected to be below. The effluent concentration limits listed in the table are the concentrations Utilities Kingston are required to be below. There was one occurrence where the Cana WPCP exceeded one of the limits set out in the ECA in 2024. In December, the monthly average Total Suspended Solids (TSS) was 0.11 mg/L, this exceeded the limit of 0.10 mg/L. Staff were able to respond and resolve the exceedance quickly, and the plant effluent is back to being well below all effluent limits. Monthly average effluent concentrations for all required sampling parameters are listed in Tables 3 and 4. There were several months when the Total Suspended Solids (TSS), and Total Phosphorous (TP) concentrations exceeded the objectives set out for the plant. All other effluent parameters with objectives set out in the ECA maintained monthly average concentrations below the objectives. Staff regularly perform in-house laboratory sampling to optimize the treatment process, and continue to work to maintain limits and objectives for effluent concentrations.

4 OPERATION

Staff continue to optimize the plant process to ensure continuous and reliable operations at the Cana WPCP. The raw sewage pumping station is regularly cleaned out to reduce the loading to the plant and improve the effluent quality. As discussed above, efforts to reduce illegal sump pump connections in 2020 reduced the peak flows dramatically. In response to the recent increase to flows in 2024, staff review Closed-Circuit Television (CCTV) footage of the pipes andcompleted spot checks to investigate the source(s).

A load of sludge from the Ravensview WPCP was used to seed the SBR's in early 2024 with healthy biomass to help improve the treatment process. This resulted in noticeable improvement in final effluent quality.

In December a plugged pump led to chemical dosing issues at the WPCP. The pump was pulled, the debris plugging the pump was removed, and the pump was put back into service. The chemical dosing issues associated with the plugged pump is inferred to be what led to the plant exceeding the monthly average effluent limit for TSS in December. As noted above, staff were able to return biomass levels to normal and effluent quality was returned relatively quickly.

5 BIOSOLIDS MANAGEMENT

There were 6 loads, totaling 68,500 m^3 in volume, of sludge collected and brought to Ravensview WPCP. The sludge was discharged at the septage facility. A similar amount of sludge is anticipated to be generated and transported to Ravensview in 2025.

6 MAINTENANCE

Staff continue to use a preventative maintenance program in accordance with manufacturer's recommendations.

Additional Maintenance completed this year:

- Routine equipment maintenance took place throughout the plant.
- The compressor was rebuilt.
- The UV disinfection system had multiple parts replaced including the Sensor, bulbs, and a control board.

7 CAPITAL WORKS

There was no capital work required for the plant this year.

8 EQUIPMENT CALIBRATIONS

All of the treatment facility flow meters are calibrated annually by third party contractors. Calibration records are available upon request.

9 COMPLAINTS

In the 2024 reporting year, the Cana WPCP received no official complaints regarding the facility or treatment process.

10 BYPASS SUMMARY

There were no bypass events in the system this year. However, it should be noted that bypass discharges have a high bacteria count due to the lack of disinfection. $CBOD_5$, TP, and TSS results are typical raw sewage influent levels. When bypasses occur, best efforts are made to capture the debris contained in any discharges to the lake. After each bypass event, shoreline inspections near

discharge points are done to monitor any debris that may come ashore, and clean-up is done if debris is found.

For further information about this report or any questions regarding accessibility, contact Tim Bourne at tbourne@utilitieskingston.com or call 613-546-1181 Ext 2190.

11 EFFLUENT OBJECTIVES AND LIMITS

Table 1 – Effluent Objectives and Limits

Effluent Parameter	Objective	Limits
CBOD5	5.00 mg/L (Monthly Average)	10.00 mg/L (Monthly Average)
Total Suspended Solids	5.00 mg/L (Monthly Average)	10.00 mg/L (Monthly Average)
Total Phosphorus	0.10 mg/L (Monthly Average)	0.20 mg/L
Total Ammonia Nitrate (Winter)	2.00 mg/L (October to March)	3.00 mg/L
Total Ammonia Nitrate (Summer)	1.00 mg/L (April to September)	2.00 mg/L
E. Coli	100 CFU/100mL	200 CFU/100mL

Note: pH maintained between 6.5 to 8.5 at all times

12 PLANT PERFORMANCE RESULTS

Table 2 – Raw Influent Results

(Monthly Average)

Month	BOD5 (mg/L)	Total Suspended Solids (mg/L)	Total Phosphorus (mg/L)	Total Ammonia Nitrogen (mg/L)	pH	Total Kjeldahl Nitrogen (mg/L)
January	78	88	2.10	10.79	7.34	15.15
February	55	81	2.10	16.48	7.87	20.24
March	30	49	1.70	13.45	7.65	16.78
April	59	85	2.20	17.01	7.55	20.70
May	59	128	2.90	18.80	7.45	25.30
June	40	88	2.20	15.55	7.52	18.23
July	49	77	2.20	13.68	7.46	16.85
August	83	144	2.60	14.21	7.56	20.92
September	64	98	2.50	20.13	7.71	23.18
October	74	89	2.90	25.48	7.72	28.26
November	126	110	2.50	16.33	7.66	21.65
December	97	103	2.20	13.61	7.51	19.35
Annual Average	68	95	2.34	16.29	7.58	20.55

Table 3 – Final Effluent Results (Part 1)

(Monthly Average)

Month	CBOD5 (mg/L)	Total Suspended Solids (mg/L)	Total Phosphorous (mg/L)	Total Ammonia (mg/L)
January	3.00	4.40	0.14	0.09
February	3.00	5.60	0.12	0.08
March	3.00	5.50	0.10	0.46
April	3.00	4.10	0.10	0.46
May	3.00	3.50	0.10	0.04
June	3.00	3.50	0.08	0.05
July	3.00	3.60	0.08	0.03
August	3.00	3.50	0.10	0.04
September	3.00	2.90	0.07	0.08
October	3.00	4.30	0.08	0.06
November	3.00	4.10	0.10	0.05
December	3.00	11.00	0.12	0.08
Annual Average	3.00	4.67	0.10	0.13

Table 4 – Final Effluent Results (Part 2)

Month	Nitrate (mg/L)	pH	E Coli (CFU/100mL)	Acute Lethality (Pass or Fail)
January	5.07	7.82	0	N/A
February	5.5	8.04	0	N/A
March	4.58	7.71	2	N/A
April	3.86	7.82	1	PASS
May	3.77	7.71	1	N/A
June	7.71	7.8	1	N/A
July	5.76	7.6	1	N/A
August	6.26	7.69	1	N/A
September	7.05	7.82	2	N/A
October	7.33	7.84	2	PASS
November	8.83	7.72	1	N/A
December	5.24	7.8	3	N/A
Annual Average	5.91	7.78	1.25	PASS

Table 5 – Upstream Surface Water Monitoring

Date	CBOD (mg/L)	Total Suspended Solids (mg/L)	Total Phosphorus (mg/L)	Total Ammonia Nitrate (mg/L)	Nitrate Nitrogen (mg/L)	E. Coli (CFU/100 mL)	pH
April 16th 2024	3.00	8.00	0.04	0.05	0.13	14	8.13
October 3rd 2024	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table 6 – Downstream Surface Water Monitoring

Date	CBOD (mg/L)	Total Suspended Solids (mg/L)	Total Phosphorus (mg/L)	Total Ammonia Nitrate (mg/L)	Nitrate Nitrogen (mg/L)	E. Coli (CFU/100 mL)	pH
April 16th 2024	3.00	6.00	0.08	0.05	0.05	13	8.23
October 3rd 2024	3.00	4.00	0.05	0.05	8.86	4	8.16

Table 7 – Reportable Bypasses

Date	Start Time	Duration (hours)	Volume (m3)	Reason	Precipitation (mm)
No bypass events to report for 2024					

Table 8 – Reportable Bypass Sampling

Date	Start Time	Duration (hours)	Volume (m3)	Reason	Precipitation (mm)
No bypass events to report for 2024					

Table 9 – Annual Plant Flows

Parameter	2019	2020	2021	2022	2023	2024
Average (m3/day)	100.05	70.10	60.00	62.70	62.70	57.70
Max (m3/day)	243.00	110.50	97.00	160.00	180.00	116.00
Design (m3/day)	125.00	125.00	125.00	125.00	125.00	125.00
Design Peak (m3/day)	200.00	200.00	200.00	200.00	200.00	200.00
Daily/Design (%)	80.04	56.08	48.00	50.16	50.16	46.16

Table 10 – Monthly Flows

Month	Rated Capacity Flow (m3/day)	Minimum Flow (m3/day)	Maximum Flow (m3/day)	Average Flow (m3/day)	Total Flow (m3/month)
January	125	53.0	116.0	81.7	2,533
February	125	58.0	107.0	81.0	2,348
March	125	59.0	101.0	78.1	2,422
April	125	41.0	113.0	78.6	2,357
May	125	40.0	72.0	55.1	1,709
June	125	31.0	62.0	49.8	1,494
July	125	33.4	78.4	49.5	1,533
August	125	30.6	89.3	51.4	1,596
September	125	25.8	67.7	41.5	1,201
October	125	13.4	36.5	30.6	921
November	125	23.5	61.6	34.2	1,025
December	125	32.1	104.6	61.4	1,860
Annual Average	125	36.7	84.1	57.7	1,750

Utilities Kingston

City of Kingston Wastewater Collection System
2024 ANNUAL REPORT

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1 EXECUTIVE SUMMARY

The City of Kingston Wastewater Collection System operates under Ministry of the Environment, Conservation and Parks (MECP), Consolidated Linear Infrastructure Environmental Compliance Approval (CLI ECA) number 018-W601.

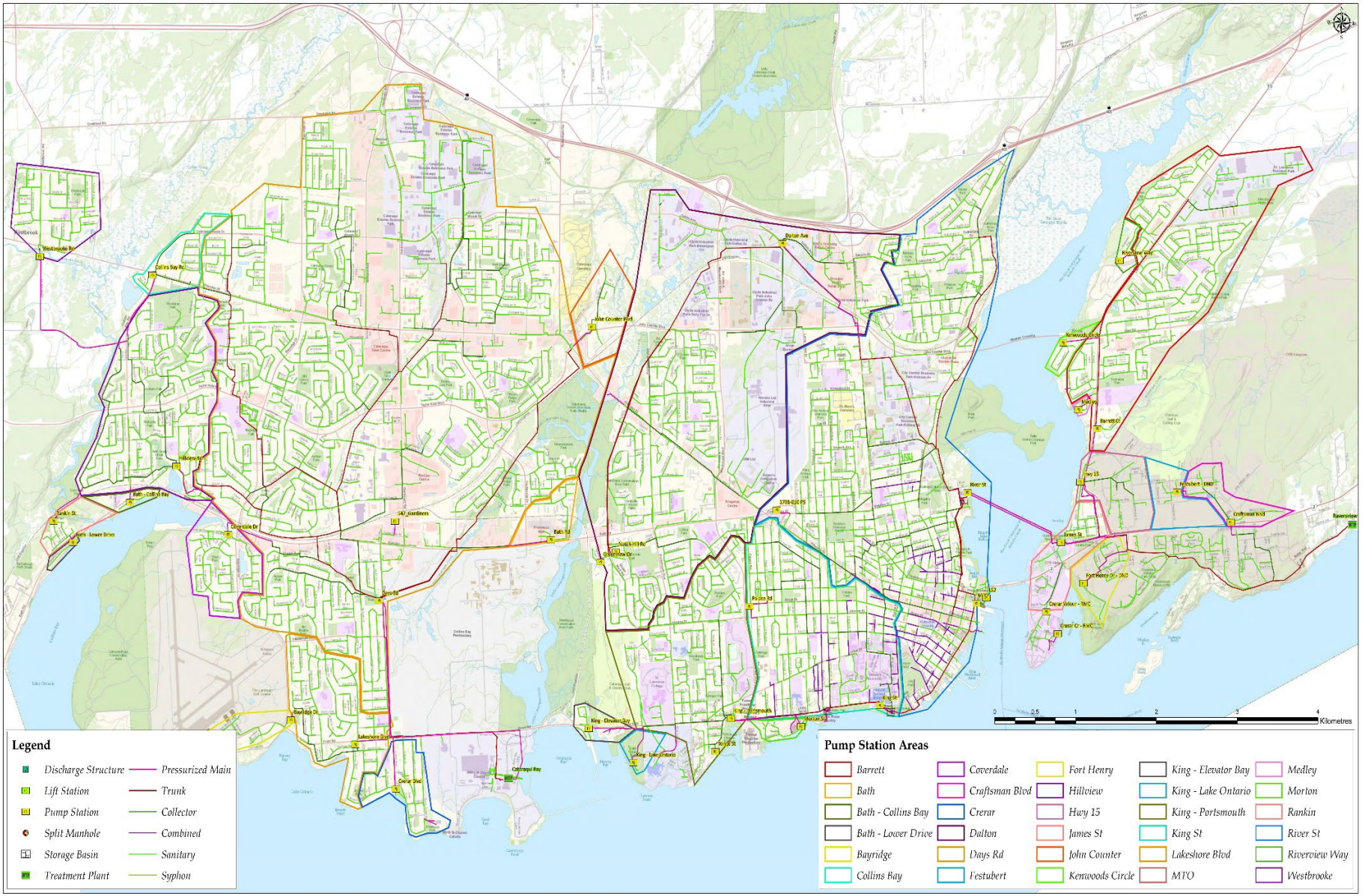
In 2024, the West Collection system received and moved 9,968,779.5 m^3 of wastewater to the Cataraqui Bay Water Pollution Control Plant (WPCP). The Central and East Collection system received and moved 19,128,065 m3 of wastewater to the Ravensview WPCP. The Cana Collection system received and moved 20,998 m^3 of wastewater to the Cana WPCP.

The collection system had several wet weather overflow events which totaled 913.33 m^3. The collection system had two spills to the environment from the collection system totaling 46 m^3. The overflow and spill locations are listed in Tables 1 and 2 respectively.

2 SYSTEM DESCRIPTION

The City of Kingston Wastewater Collection System collects and transmits sewage to one of three WPCPs, depending on the pump station area. The collection system consists of 474 km of gravity sewers (including 42.8 km of trunk sewers, 50.7 km of collector sewers and 381.0 km of local sewers) and includes 18 km of combined sewers but excludes the approximately 38,384 active service laterals to the property line. The collection system also has 29 sewage Pumping Stations (PS), three combined sewer overflow (CSO) tanks, six combined sewage retention tanks, and 29.0 km of forcemains, with final discharge into one of three Water Pollution Control Plants including Ravensview, Cataraqui Bay, and Cana.

Figure 1 – City of Kingston Collection System Major Infrastructure



3 OPERATION

Adequate staffing as well as preventative maintenance and regular equipment inspections allowed operational problems to be diagnosed quickly and corrective actions to be taken immediately. Non-flushable materials such as wipes, and grease continue to be more prominent in the sewer system resulting in some operational and maintenance challenges. Utilities Kingston continues to implement a public education program to help customers become more aware of what materials should not be flushed down the sewers. This program has included radio and media campaigns, bill stuffers, information on back of parking tickets, and bus information signs. This has been an ongoing campaign for many years with positive results. During the summer of 2024, staff educated owners of grease traps on how to properly maintain their equipment. Pamphlets describing the importance of appropriate grease trap maintenance and how it impacts the City's sanitary sewer collection system were delivered to many restaurants across the city.

Throughout the collection system, there are known sections that become clogged with non-flushable materials, and grease. There are 46 of these sections, they are monitored regularly and proactively cleaned when required. During 2024, crews inspected these sections a total of 523 times, 317 of those times flushing and cleaning were required.

Staff encountered operational problems at several pumping stations across the system that were a result of grease build up. These problems ranged from grease interfering with level instruments, to floats being caught up in the grease. Third party contractors were brought in several times throughout the year to clean wet wells and remove the grease and other non-flushable items as required.

Throughout the end of 2023 and early 2024, Collins Bay Road Sewage Pumping Station was inundated with extreme flows of water during rain events. These extreme flows had to be managed with the use of vacuum trucks to help avoid flooding and spills to the environment. Investigations into the source of the water took place, and a break in a pipe was located. This break allowed groundwater to flow freely into the collection system. A third-party contractor was brought in to grout the break in the pipe, and flows have dramatically decreased since.

During 2023, there were several spills of sewage from the Barrett Court PS. In response to this, a large project to replace the pumps and associated valving was started in 2024. Two of the three pumps and valving and piping were replaced with the third and final pump set for replacement in early 2025.

CSOs located in the collection system, both inline overflows and dedicated tanks, are inspected regularly throughout the year. There was a total of 70 inspections on the 13 active CSOs in 2024.

4 SYSTEM FLOWS

The City of Kingston wastewater collection system transported 29,096,844.5 m^3 of sewage to the Ravensview and Cataraqui Bay WPCPs. The Cana system collected and transported 20,998 m^3 of sewage to the Cana WPCP. The concentration of the raw influent into the three WPCP's increases as the volume of flow decreases. The flow into each plant also increases as the number of wet weather events increase. The increased flow during the wet season, as well as the differences in concentrations that correlate to changes in volumes, indicates there is ground water infiltration and/or illegal sump or roof leader connections in the systems.

5 BYPASS & OVERFLOW SUMMARY

The collection system had several wet weather overflow events which totaled 913.3 m^3 for 2024. The locations and total volumes of overflows can be found in Table 1. The surrogate loading rates from these overflow events are listed in Table 3. There were two spills to the environment from the collection system, totaling 46 m^3. The locations and details of the spills are located in Table 2. There

were no bypasses at any of the treatment facilities in 2024. The loading rates for the spills are in Table 4. None of the collection system overflows or spills were disinfected, and no adverse impacts were noted. Staff checked for, and cleaned up, any debris and garbage after each event. The number of overflows, and the volume of overflows, was dramatically reduced in 2024 compared to 2023. The rainfall events in 2024 were much less severe than in 2023, and that coupled with the efforts to separate storm and sanitary sewers has led to the reduced overflow volumes. The wet weather flow capture rate is calculated by Utilities Kingston each year, and data going back to 2010 is shown in Figure 2 – Wet-weather Flow Capture. In 2017, Utilities Kingston released a real-time overflow map that displays overflow locations and lets you know if an overflow has occurred within the past 48 hours.

6 OVERFLOW REDUCTION EFFORTS

The City of Kingston and Utilities Kingston have been working to reduce the number of combined sewers, both sanitary and storm water in the same pipe, within the collection system. These combined sewers are the primary source of overflows in the system during wet weather. Several large. combined sewer separation projects are expected in 2025. A much larger budget has been allocated to overflow reduction projects for 2025 compared to 2024.

The 2025 overflow reduction projects are:

- Sewer separation of Princess St (Albert to Division) and Garrett St Sewer Separation Project;
- Main St., Vine St., Ellice St. Sewer work and Separation Project;
- Sewer separation of Orchard St., and River St.; and
- Crerar Blvd SPS, Capacity increase including Forcemain replacement.

These 2025 projects have a total budget of $11.9 Million.

The proposed 2025 projects are all aimed at reducing and working towards separating and ultimately eliminating sewage overflows from the combined system. The work throughout 2024 included combined sewer separation of: two blocks of Victoria St., one block of Earl St., one block of Collingwood St., one block of Couper St., and two blocks of Union St. These projects will be completed in 2025. The budget for the 2024 overflow reduction construction projects was $1.93 million.

7 POLLUTION PREVENTION CONTROL PROGRAM

The Utilities Kingston Pollution Prevention and Control Plan (PPCP) was developed in 2017 and is set to be updated in 2025/2026. The PPCP focuses on combined sewer separation to reduce the number of overflows from the facilities in the future. The 2024 combined sewer separation projects reduced a large section of combined sewers that lead to a CSO tank that regularly overflows during rain events.

There were no specific timelines produced for the 2017 version of the PPCP. The City of Kingston and Utilities Kingston remain dedicated to completing sewer separations within the collection system in preparation for future population growth. More funds are being directed to PPCP work, following several years of other larger City of Kingston Infrastructure projects that are now complete.

Utilities Kingston completed inspections including collecting Closed-Circuit Television (CCTV) footage of large sections of trunk sanitary sewers throughout the summer. These inspections help to build our asset management inventory and identify any potential issues before they cause problems.

Utilities Kingston is working towards meeting the objectives set out in procedures F-5-1, and F-5-5, which describe the treatment requirements for municipal sanitary, and combined sewage systems. The City of Kingston Wastewater Collection System meets all of the minimum controls required by these procedures. Many projects have been completed, bringing the City's system closer to meeting

all of the objectives. These projects have reduced the frequency and quantity of system overflows over the past several years. The proposed future combined sewer separation projects and targeted sanitary sewer upgrades will continue to bring the system closer to meeting the objectives set out in these procedures. Utilities Kingston does not regularly meet the Beach Protection Criterion set out in the F-5-5 documents. Figure 3 – Number of CSO Events during June-September indicates that Utilities Kingston is getting closer to meeting the objective. All of the above-mentioned work will have a direct impact on the number and severity of overflows in the future. It appears the sewer separation and other overflow reduction projects are having the desired impact, although the weather has been less severe over the past several years as well. These results and the correlation to weather severity are shown in Figure 4 – Annual Overflow Volumes and Storm Severity Index.

8 CALIBRATIONS

Many of the pumping stations have flow meters installed which helps to investigate inflow and infiltration, as well as any operational problems that may occur. Third party contractors calibrated all facility flow meters. Calibration records are available upon request.

CSO overflow points have methods of recording volumes of sewage that overflow the sanitary system and discharge into the lake, or the storm water system. There are 15 flow monitoring devices used for these measurements. 11 of the 15 flow monitors were calibrated in 2024. Two locations were unavailable to staff due to security concerns, and two were unable to be calibrated due to conditions and faulty connection equipment. These four locations will be addressed and calibrated in 2025.

9 MAINTENANCE

Staff continued to use a preventative maintenance program in accordance with manufacturer's recommendations.

Additional Major Maintenance completed this year:

- Infrared scans of high voltage electrical was performed at Pumping Stations throughout the City.
- Equipment and motors had routine vibration monitoring conducted.
- King St. PS had one pump rebuilt.
- River St. PS main utility power breaker was replaced.
- King-Elevator Bay PS had major generator maintenance performed.
- Days Rd PS had the odour control media replaced.
- Bath Rd PS had one pump rebuilt.
- Hillview PS had a main breaker replaced, and a redundant level sensor installed.
- Rankin PS had a new control panel installed, as well as new discharge isolation, and check valves installed.
- Bath-Lower Drive PS had a new check valve installed, a generator hookup installed, and one pump rebuilt.
- Six air relief valves in the system were cleaned and had maintenance completed on them.

10 CAPITAL WORKS AND ALTERATIONS

The major highlights for capital works were:

- Construction of the Days Rd. PS was completed, and the station has been brought into service.
- King St. PS had a flow meter installed on the pumped header to the CSO tank.
- River St. PS generator controls were replaced.
- Barrett Ct. PS has had two of the three pumps and associated piping and valves replaced.
- Bayridge Dr. PS had a new flow meter installed.

- 14 Pumping Stations had alarm communication upgrades completed.

11 COMPLAINTS

In the 2024 reporting year, there were a number of complaints from residents regarding the system.

There were 14 odour complaints connected to the new Days Rd. PS. Utilities Kingston operations staff investigated the complaints and inspected the odour control unit at the facility regularly to ensure it was functioning and being properly maintained. The media in the odour control unit was replaced during the year, and modifications to the odour control system have been made to attempt to reduce the amount of odour escaping the station. Utilities Kingston had the contractor and engineering firm that were hired to construct the station design and implement possible solutions.

There were an additional 14 odour complaints, regarding the collection system. These complaints include sewage odours noted in residences and businesses. Staff responded and investigated all of these complaints. Responses to these complaints included inspecting infrastructure upstream and downstream of the complaint, installing dishes in manholes to reduce the chance of sewer gasses being released, jetting and cleaning pipes, inspecting lines with a camera, some visits to residences and businesses, and sewage sampling.

Staff responded to 127 complaints about lateral and main collection system backups. Operations staff worked with property owners and tenants at each site to locate and confirm the source of the backup. The majority of the sewer backups were caused by non-flushable materials, tree root growth, or deformed or degraded pipes. 71 of the 127 complaints were related to private infrastructure (i.e., the homeowner or business owner's sewer lateral on their property). Staff worked to relieve these backups using different methods. Crews rodded lines, performed camera work to identify and locate the issue, used jet trucks to clear blockages to return the collection system to good working order. Operators also proactively flush known problem sewers, in order to maintain the integrity of the collection system.

For further information about this report or any questions regarding accessibility, contact Tim Bourne at tbourne@utilitieskingston.com or call 613-546-1181 Ext 2190.

12 ANNUAL OVERFLOW SUMMARY

Table 1 – Annual Overflow Summary

PCP #	Location	Number of Events	Volume (m3)
1	Orchard-Emma Martin CSO	0	0.00
2	535 Rideau Belle Park Trunk	0	0.00
5	Dalton Ave PS	0	0.00
14	Barrack St E of King St	0	0.00
22	William St W of Ontario St	0	0.00
23	Earl St W of Ontario St	6	20.87
24	Gore St W of Ontario St	0	0.00
25	Lower Union W of Ontario St	5	182.29
26	West St S of King St	0	0.00
28	King St (O'Kill) PS	0	0.00
34	Helen St at Mack St	0	0.00
35	Palace Rd PS	0	0.00
41	Morton St PS	0	0.00
43	King-Portsmouth PS	0	0.00
48	West end of Sherwood Dr	0	0.00
50	South end of Parkway	0	0.00
51	Clarence St W of King St	0	0.00
52	Raglan Rd at Rideau St	0	0.00
53	Union St at Division St	0	0.00
55	King-George CSO	0	0.00
56	King-Collingwood CSO	0	0.00
57	Crerar PS	0	0.00
65	535 Rideau Belle Park Local	3	710.16
68	Quebec St at Barrie St	0	0.00
69	Greenview Dr PS	0	0.00
70	Carlisle St at Chestnut St	0	0.00
74	Barrett Court	0	0.00
79	Riverview Way PS	0	0.00
N/A	Total	14	913.32

13 ANNUAL SPILL SUMMARY

Table 2 – Annual Spill Summary

PCP #	Location	Number of Events	Volume (m3)
1	Orchard-Emma Martin CSO	0	0.00
2	535 Rideau Belle Park Trunk	0	0.00
5	Dalton Ave PS	0	0.00
14	Barrack St E of King St	0	0.00
22	William St W of Ontario St	0	0.00
23	Earl St W of Ontario St	0	0.00
24	Gore St W of Ontario St	0	0.00
25	Lower Union W of Ontario St	0	0.00
26	West St S of King St	0	0.00
28	King St (O'Kill) PS	0	0.00
34	Helen St at Mack St	0	0.00
35	Palace Rd PS	0	0.00
41	Morton St PS	0	0.00
43	King-Portsmouth PS	0	0.00
48	West end of Sherwood Dr	0	0.00
50	South end of Parkway	0	0.00
51	Clarence St W of King St	0	0.00
52	Raglan Rd at Rideau St	0	0.00

PCP #	Location	Number of Events	Volume (m3)
53	Union St at Division St	0	0.00
55	King-George CSO	0	0.00
56	King-Collingwood CSO	0	0.00
57	Crerar PS	0	0.00
65	535 Rideau Belle Park Local	0	0.00
68	Quebec St at Barrie St	0	0.00
69	Greenview Dr PS	0	0.00
70	Carlisle St at Chestnut St	0	0.00
74	Barrett Court	1	45.00
76	Ravensview Water Pollution Control Plant	0	0.00
79	Riverview Way PS	0	0.00
N/A	Collection System Breaks	1	1.00
N/A	Total	2	46.00

14 OVERFLOW LOADING RATE

Table 3 – Overflow Loading Rate

Date	Location	Duration	Volume (m3)	BOD (kg)	TP (kg)	TSS (kg)	TKN (kg)	E.Coli
June 13th 2024	PCP 23 - Earl St	0:20	0.883	0.08	0.00	0.05	0.00	92,521
June 13th 2024	PCP 25 - Lower Union	0:15	16.832	1.62	0.01	0.99	0.09	92,521
June 23rd 2024	PCP 23 - Earl St	0:05	0.267	0.03	0.00	0.02	0.00	92,521
July 10th 2024	PCP 23 - Earl St	6:00	10.288	0.99	0.01	0.61	0.06	92,521
July 10th 2024	PCP 25 – Lower Union	9:00	88.711	8.52	0.08	5.23	0.50	92,521
July 10th 2024	PCP 65 - 535 Rideau Belle Park	0:10	34.803	3.34	0.03	2.05	0.19	92,521
Aug 9th 2024	PCP 23 - Earl St	0:30	3.577	0.34	0.00	0.21	0.02	92,521
Aug 9th 2024	PCP 25 – Lower Union	0:30	25.404	2.44	0.02	1.50	0.14	92,521
Aug 9th 2024	PCP 65 - 535 Rideau Belle Park	1:35	536.279	51.48	0.46	31.64	3.00	92,521
Aug 19th 2024	PCP 23 - Earl St	0:10	1.927	0.18	0.00	0.11	0.01	92,521
Aug 19th 2024	PCP 25 – Lower Union	0:10	15.777	1.51	0.01	0.93	0.09	92,521
September 7th 2024	PCP 23 - Earl St	0:15	3.927	0.38	0.00	0.23	0.02	92,521
September 7th 2024	PCP 25 – Lower Union	0:20	35.569	3.41	0.03	2.10	0.20	92,521
September 7th 2024	PCP 65 - 535 Rideau Belle Park	0:20	139.081	13.35	0.12	8.21	0.78	92,521

15 SPILL LOADING RATES

Table 4 – Spill Loading Rates

Date	Location	Duration	Volume (m3)	BOD (kg)	TP (kg)	TSS (kg)	TKN (kg)	E.coli
May 24th 2024	PCP 74 - Barrett Ct	0:50	45	1.26	0.24	2.52	2.44	9,200,000
December 27th 2024	Bath Rd & Centennial Dr	2:00	1	198.00	6.77	205.00	51.00	1,080,000

16 OVERFLOW AND BYPASS EVENT AND VOLUME GRAPHS

Figure 1 – Wet-weather Flow Capture

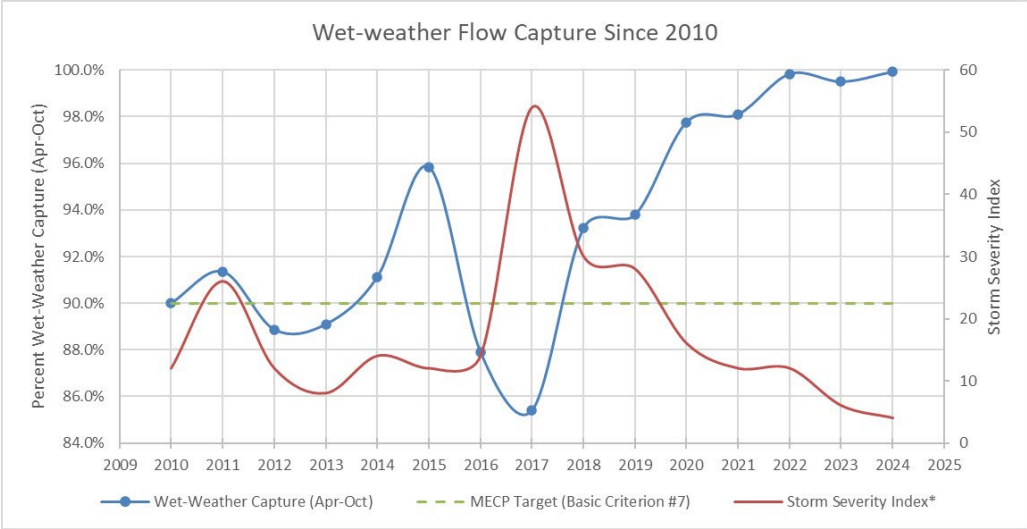


Figure 2 – Number of CSO Events during June-September

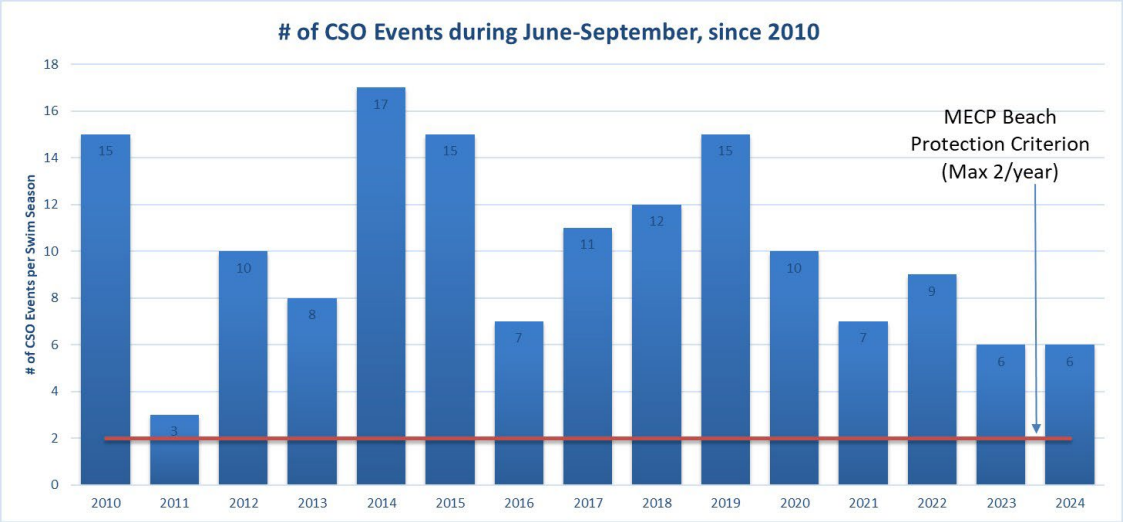


Figure 3 – Annual Overflow Volumes and Storm Severity Index