



**Utilities Kingston  
Report to Council  
Report Number 21-041**

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**To:** Mayor and Members of Council  
**From:** Jim Keech, President & CEO, Utilities Kingston  
**Resource Staff:** Heather Roberts, Director, Water & Wastewater Services  
**Date of Meeting:** February 16, 2021  
**Subject:** 2020 Water System Annual Summary Reports and 2020 Wastewater Annual Reports

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**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 owned by the City of Kingston, and operated by Utilities Kingston:

- King Street Water Treatment Plant;
- Point Pleasant Water Treatment Plant;
- Cana Well Water Treatment and Supply System;
- Ravensview Wastewater Treatment Plant;
- Cataraqui Bay Wastewater Treatment Plant;
- Cana Wastewater Treatment Plant; and
- The River Street Pumping Station and major combined sewer overflow facilities.

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 are provided for information purposes to Council and require no action. The wastewater reports are also provided to the Ministry of the Environment, Conservation and Parks.

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**Recommendation:**

**That** Council receive the 2020 Annual Summary Reports for the King Street Water Treatment Plant, the Point Pleasant Water Treatment Plant and the Cana Well Water Treatment and Supply System as required by the terms and conditions outlined in Schedule 22 of Ontario Regulation 170/03 for Drinking Water Systems.

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**Authorizing Signatures:**

ORIGINAL SIGNED BY PRESIDENT  
& CEO, UTILITIES KINGSTON

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**Jim Keech, President & CEO,  
Utilities Kingston**

**Consultation with the following Members of the Corporate Management Team:**

Paige Agnew, Commissioner, Community Services	Not required
Peter Huigenbos, Commissioner, Business, Environment & Projects	Not required
Brad Joyce, Commissioner, Corporate Services	Not required
Desirée Kennedy, Chief Financial Officer & City Treasurer	Not required
Sheila Kidd, Commissioner, Transportation & Public Works	Not required

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**Options/Discussion:****Annual Water Summary Reports**

The Annual Water Summary Reports are a statement to satisfy compliance with all 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 a detailed description of the measures taken to ensure compliance with the Drinking Water Works Permit (DWWP) and the Municipal Drinking Water Licence (MDWL). These annual compliance 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 operators as they relate to the water quality parameters outlined within the drinking water regulations.

The Annual Compliance Reports also summarize specific instances of non-compliance and adverse water quality during the 2020 reporting period which are summarized below in this covering report.

**King Street Water Treatment Plant**

There were no instances of non-compliance during the 2020 reporting period.

There were two (2) 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 2020 reporting period.

1. **September 30, 2020:** Notification for total coliform bacteria (TC) with a count of 12 cfu/100ml. Free chlorine residuals at the time of sampling were 1.30 mg/L. Subsequent resampling and testing was undertaken with no adverse conditions/results.

The first notification of an adverse result was associated with Total Coliform with a count of 12 cfu/100mL from a sample collected on September 20, 2020. However, at the time of the sample, an acceptable level of 1.30 mg/L for free chlorine residual was measured and present.

Resamples were collected from the same location, plus upstream and downstream and sent to the lab for analysis. With the free chlorine residual present in the original sample, and the fact that the subsequent resamples did not indicate any adverse conditions, it was suspected that the adverse conditions found in the original sample were the result of a contaminated sample bottle or sampling error.

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2. **December 3, 2020:** Notification for free chlorine residual of 0.02 mg/L. Completed flushing at a nearby hydrant until testing concluded that the free chlorine residual of 1.45 mg/L was restored. A bacteriological sample collected from the hydrant was also taken and reported no adverse conditions.

The second notification of an adverse water quality incident occurred on December 3, 2020 due to a free chlorine residual of 0.02 mg/L in the distribution system. The system was flushed at a nearby hydrant until the chlorine residual was restored to acceptable level. The free chlorine residual at the end of the flushing period was 1.45 mg/L. A bacteriological sample was also collected from the hydrant at the time of the incident to ensure acceptable water quality conditions and confirm that no further adverse conditions were present.

### **Point Pleasant Water Treatment Plant**

There were no instances of non-compliance during the 2020 reporting period, or any adverse sampling results.

There were no events within the Point Pleasant Water Treatment Plant that required notification during the 2020 reporting period.

### **Cana Well Water Treatment and Supply System**

There were no instances of non-compliance during the 2020 reporting period, or any adverse sampling results.

There was one notification of an adverse water quality reported to the Spills Action Centre and to the Environmental Health Division of the local Ministry of Health during the 2020 reporting period.

The single notification was provided to the Medical Officer of Health and the Spills Action Centre on March 5, 2020. The notification was made after the distribution system experienced a loss of pressure because of an extended power outage and failure of the backup generator system at the Cana Drinking Water 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 total coliform. Upon receipt of clear test results, the boil water advisory was rescinded.

There were no further incidents which required notification during the 2020 reporting period. However, it should be noted that, the ground water supply for Cana contains sodium concentrations greater than 20mg/L. Testing throughout 2020 continues to confirm consistent results exceeding the limit. These results require notification to the Medical Officer of Health and the Spills Action Centre if a report under section 18(1) of the *Safe Drinking Water Act* has not been made within the last 57 months. The last notification provided was in January 2018, therefore no action in 2020 was required.

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## Wastewater Annual Reports

Annual reports for the wastewater facilities are a requirement identified in the conditions of environmental approvals for each treatment facility, one pumping station and two Combined Sewer Overflow (CSO) facilities. The annual reports are required to be submitted to the Ministry of the Environment, Conservation and Parks but are provided to Council for information purposes. The reports provide a useful summary of the operations for the previous year at Ravensview Wastewater Treatment Plant (WWTP), Cataraqui Bay WWTP and Cana WWTP; River St Pumping Station and the Orchard and Collingwood CSO facilities.

### Ravensview Wastewater Treatment Plant

In 2020, the Ravensview WWTP was in compliance with all of the conditions outlined in Condition 7 of the Certificate of Approval issued for Ravensview.

Average flows through the plant were recorded at 59,435 m<sup>3</sup>/day, slightly lower than the 2019 flows. The facility experienced three secondary bypass events in 2020 (primary treatment was maintained) and several other bypass events within the Kingston East Sewage Collection System, all due to wet weather events.

### Cataraqui Bay Wastewater Treatment Plant

In 2020, the Cataraqui Bay WWTP was in compliance with all concentrations, loadings, sampling and maintenance as required in the environmental compliance approval (ECA).

Average flows at Cataraqui Bay were 27,189 m<sup>3</sup>/day, slightly lower than the 2019 flows. Plant staff continue to maintain operations at this facility while major reconstruction activity occurs. The facility had one secondary by-pass events in 2020 (primary treatment was maintained) and three bypass events within the Kingston West Sewage Collection System, all due to wet weather events.

In the 2020 reporting year, the Cataraqui Bay WWTP received 3 official complaints related to odour. Due to the WWTP upgrades currently underway, and a change in process, hydrogen sulphide has been detectable to nearby residents. Investigations are underway to reduce the odours via process adjustments. When the facility upgrade is complete, it is expected that odours will be reduced further.

### Cana Wastewater Treatment Plant

In 2020, the Cana WWTP was in compliance with all conditions of the ECA. The average daily flows at Cana for 2020 were 70.10 m<sup>3</sup>/day. The facility experienced 3 by-pass events in 2020, all due to wet weather events.

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**River Street Pumping Station**

In 2020, the River Street Pumping Station was in compliance with all conditions identified in the Certificate of Approval. The total flows through the station for 2020 was approximately 2.3 million m<sup>3</sup>. The pumping station did not experience any by-passes in 2020.

**Orchard Street and Collingwood Street Combined Sewer Overflow**

In 2020, the Orchard Street Combined Sewer Overflow (CSO) managed 35,170 m<sup>3</sup> with no by-passes reported. There were no repairs undertaken, however, it should be noted that debris was cleaned out of a tank in 2020.

In 2020, the Collingwood CSO saw total volumes of 168,621 m<sup>3</sup> of which 32,647.3 m<sup>3</sup> was by-passed due to wet weather events. This occurred in 4 separate events. Collingwood is also one of the sites that has real time monitoring and public notification when an overflow event occurs.

**Existing Policy/By-Law:**

None

**Notice Provisions:**

None

**Accessibility Considerations:**

None

**Financial Considerations:**

None

**Contacts:**

Jim Miller, Chief Operating Officer, 613-546-1181, extension 2475

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

Julie Runions, Manager, Water and Wastewater Treatment, 613-546-1181, extension 2172

**Other City of Kingston Staff Consulted:**

None

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**Exhibits Attached:**

Exhibit A – King Street Water Treatment Plant – Annual Summary Report 2020

Exhibit B – Point Pleasant Water Treatment Plant – Annual Summary Report 2020

Exhibit C – Cana Well Water Treatment and Supply System – Annual Summary Report 2020

Exhibit D – Ravensview Wastewater Treatment Plant – Annual Report 2020

Exhibit E – Cataraqui Bay Wastewater Treatment Plant – Annual Report 2020

Exhibit F – Cana Wastewater Treatment Plant – Annual Report 2020

Exhibit G – Combined Sewer Overflow Facilities – Annual Report 2020





**Utilities**  
Kingston

**ANNUAL SUMMARY REPORT  
2020**

**KING STREET  
WATER TREATMENT PLANT**

WATERWORKS NUMBER: 220001860

**Reporting Period**

**January 1, 2020 – December 31, 2020**

Submitted by:  
Jim Keech, Professional Engineer  
President & C.E.O.



## **ANNUAL SUMMARY REPORT 2020**

### **KING STREET WATER TREATMENT PLANT**

WATERWORKS NUMBER: 220001860

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 Licence (MDWL) issued for the King Street Water Treatment Plant, to comment on any incidents of non-compliance during the reporting period, to summarize the quantities of the water supplied and to 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, and 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.

#### **Non-Compliance with Terms and Conditions of the DWWP/MDWL**

There were no incidents of non-compliance during this reporting period.

#### **Compliance with the Terms and Conditions of the DWWP/MDWL**

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 Drinking Water Works Permit (DWWP) and Municipal Drinking Water Licence (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 licenced 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 licences 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 licenced 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.

### Notifications of Adverse Water Quality Results

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 (MOH). 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 more closely monitor the parameter for a period of time. The details of any events requiring notifications are listed below.

-Notification of an indicator of adverse water quality was received from Caduceon Environmental Laboratories regarding a sample collected on September 29, 2020 for Total Coliform (TC) with a count of **12 cfu/100mL**. Free chlorine residual at the time of sampling was **1.30 mg/L**. Notifications were made to the Spills Action Center 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 an adverse water quality incident was provided to the Medical Officer of Health and Spills Action Centre on December 3, 2020 due to a free chlorine residual of 0.02 mg/L in the distribution system. The system was flushed at a nearby hydrant until the chlorine residual was restored. Free chlorine residual at the end of the flushing period was 1.45 mg/l. A bacteriological sample was also collected from the hydrant at the time of the incident to ensure water quality and results did not indicate any adverse conditions.

### **Summary of the Quantity of Water Supplied During the Reporting Period**

Listed in Tables 3 & 4 following this report are the treated water flows for the King Street Water Treatment Plant for the year 2020. The serviced population for the King Street WTP and Point Pleasant WTP is 123,798 (population estimate based on growth rates from Census data for 2016). The annual average daily use was 18,191 cubic meters per day from the Point Pleasant WTP and 41,059 cubic meters per day from the King Street WTP for the year of 2020. Total average per capita use was calculated at 478 litres per person/day. The metered residential use for 2020 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. Leak detection surveys are typically undertaken on a bi-annual basis or when system losses become noticeably high.

### **Summary of 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<sup>3</sup>/d. Listed in Tables 1 & 2 following this report are the raw water flows (water taken from Lake Ontario) for the King Street Water Treatment Plant for the year 2020.

### **Summary of 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. 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. Average chlorine dosage for this treatment plant is approximately 2.24 mg/l. Residuals are routinely measured in the distribution system and the treatment plant chlorine dosages are adjusted as required to meet the distribution system target residuals and the required CT values.

Typical PACl dosages for this treatment plant are in the range of 4.2 – 6.6 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 St. 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.

## 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 [www.utilitieskingston.com](http://www.utilitieskingston.com) or is available at Kingston City Hall or the Utilities Kingston offices. For further information about this report or any questions regarding accessibility contact Megan Lockwood at [mlockwood@utilitieskingston.com](mailto:mlockwood@utilitieskingston.com), or call 613-546-1181 Ext 2 2 9 1.



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King St. Water Treatment Plant - Raw Water Flows 2020  
 m<sup>3</sup>

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	45,500	47,200	45,900	44,900	32,200	44,900	40,000	45,600	45,800	47,200	38,700	45,400
2	45,300	47,300	45,700	45,400	40,700	45,200	47,100	45,600	45,400	46,700	50,100	45,600
3	45,500	47,100	48,250	45,200	45,700	45,600	47,000	45,600	45,800	47,100	45,500	45,700
4	45,700	47,200	45,600	36,000	45,500	45,300	46,800	45,500	45,800	46,800	45,300	45,500
5	45,900	46,700	46,000	43,500	45,400	45,500	46,800	37,300	45,800	46,800	45,500	45,400
6	45,700	45,200	45,800	45,400	45,300	42,100	47,000	46,000	45,900	37,300	45,400	45,500
7	45,800	46,900	45,500	45,300	36,900	34,800	47,000	45,800	45,600	41,000	40,200	45,500
8	46,000	52,800	43,900	45,100	44,000	45,800	47,100	45,700	45,700	46,600	51,200	45,500
9	45,800	52,900	46,000	45,200	46,700	45,500	46,800	45,800	47,300	45,500	37,400	45,600
10	45,900	46,700	48,200	35,800	46,500	43,600	47,000	45,800	50,700	42,800	45,400	44,300
11	45,700	45,400	48,300	41,300	35,600	45,700	37,100	45,900	45,800	35,900	45,600	45,500
12	45,700	48,200	47,200	45,500	41,300	45,500	33,900	46,000	45,900	45,700	45,600	45,500
13	47,800	52,500	47,300	45,400	44,600	43,400	45,300	45,300	45,500	45,700	45,500	45,500
14	52,300	47,100	48,300	45,100	45,300	35,000	45,700	45,500	40,200	45,000	45,400	45,700
15	43,900	45,500	54,800	45,300	45,200	45,600	45,400	45,500	45,500	38,800	45,400	45,800
16	45,700	45,400	49,800	45,300	31,900	44,500	45,800	45,600	45,700	39,800	45,400	45,500
17	45,900	45,600	47,000	45,100	37,700	45,800	45,400	45,400	45,700	44,400	40,800	45,200
18	45,700	45,400	45,900	45,100	49,400	45,500	45,500	45,600	45,800	39,500	45,800	45,700
19	46,200	44,900	45,800	45,200	45,400	45,400	45,300	40,600	45,700	40,400	45,500	45,600
20	52,600	45,500	45,700	45,100	40,700	46,300	45,500	45,500	45,800	44,500	45,400	45,600
21	48,800	45,400	45,700	45,200	44,700	45,600	45,100	45,400	46,100	45,200	45,300	47,600
22	45,900	45,800	45,800	37,700	46,800	45,500	45,200	33,000	48,700	45,300	45,400	42,900
23	45,800	45,600	45,600	45,300	45,300	37,600	45,600	45,900	54,000	45,500	45,300	45,500
24	45,600	46,000	40,000	45,400	45,300	39,200	44,500	45,600	49,600	45,500	34,300	45,400
25	45,800	46,300	39,400	37,600	45,500	45,600	45,600	45,600	40,300	45,400	46,100	42,800
26	46,000	48,900	45,500	33,900	45,500	45,500	45,600	45,700	45,600	36,700	45,400	37,700
27	45,900	45,500	45,300	45,400	44,300	45,300	45,500	45,200	46,100	34,800	45,300	45,500
28	45,800	46,000	45,000	45,500	44,700	45,600	45,800	39,500	47,600	45,600	45,300	45,400
29	46,100	46,000	45,400	45,600	45,300	45,500	45,700	36,200	52,100	45,400	45,500	45,300
30	49,400		45,300	40,500	45,300	41,600	45,800	39,100	45,300	36,300	45,500	39,100
31	53,300		45,100		35,800		45,800	45,600		46,600		41,300
Total	1,447,000	1,315,000	1,429,050	1,302,300	1,334,500	1,318,000	1,397,700	1,366,400	1,390,800	1,339,800	1,338,500	1,388,100
Average	46,677	46,931	46,098	43,410	43,048	43,933	45,087	44,077	46,360	43,219	44,617	44,777
Min	43,900	44,900	39,400	33,900	31,900	34,800	33,900	33,000	40,200	34,800	34,300	37,700
Max	53,300	52,900	54,800	45,600	49,400	46,300	47,100	46,000	54,000	47,200	51,200	47,600

**PTTW Amount**    **118,000 m<sup>3</sup>/day**

**Yearly Average**            **44,853**  
**Yearly Min**                    **31,900**  
**Yearly Max**                    **54,800**



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King St. Water Treatment Plant - Peak (Raw) Flows 2020  
 m<sup>3</sup>

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	49,000	49,490	51,000	50,000	41,500	51,180	52,290	48,300	48,800	59,000	55,000	47,810
2	55,000	49,590	48,140	54,000	53,910	47,450	52,000	48,760	47,790	52,680	56,980	55,000
3	53,000	53,000	45,800	47,960	50,260	48,950	52,000	48,040	48,690	52,000	47,980	50,000
4	52,000	66,000	50,000	46,400	50,000	49,080	49,040	47,750	50,000	51,000	52,000	48,200
5	50,000	57,000	48,770	53,450	50,000	50,000	49,240	47,840	49,000	52,000	49,000	47,620
6	50,000	53,000	50,000	48,120	47,880	51,000	49,670	49,750	50,000	50,000	49,000	47,910
7	48,300	56,660	49,000	48,420	46,860	43,780	49,530	48,380	48,520	57,000	56,000	48,030
8	49,200	56,960	50,000	48,110	55,660	48,550	51,000	48,300	48,730	54,000	57,000	48,030
9	49,000	56,850	48,530	47,570	48,570	48,280	51,000	48,370	51,340	47,710	47,180	47,860
10	50,000	52,630	55,880	48,000	48,740	54,000	49,530	50,000	60,740	47,590	47,610	50,990
11	50,000	48,010	57,810	47,080	49,000	51,000	49,330	48,950	52,000	51,000	51,240	48,880
12	49,000	56,000	49,390	50,000	64,000	48,010	48,950	48,680	50,000	48,350	47,950	48,410
13	55,950	67,000	50,230	47,950	57,000	48,840	48,380	48,670	49,000	48,140	47,630	48,480
14	56,550	55,460	59,000	48,190	50,000	52,200	49,100	48,410	47,320	52,000	47,920	50,000
15	52,860	47,690	61,000	48,390	48,430	48,890	48,110	48,490	47,890	47,100	50,000	50,000
16	48,280	47,640	60,000	54,000	40,320	48,600	48,060	48,300	48,590	48,780	50,000	51,000
17	48,140	47,970	52,000	47,350	53,970	53,850	49,000	49,000	47,740	48,020	65,000	47,980
18	48,260	48,000	52,000	48,080	56,630	48,400	50,000	49,000	48,380	47,160	56,000	50,000
19	50,800	48,780	50,000	47,610	47,710	48,420	49,000	49,000	47,850	50,960	47,820	50,000
20	56,040	48,070	49,000	47,760	49,000	46,300	48,070	65,000	48,000	50,000	49,000	49,000
21	55,900	50,000	47,960	48,070	63,000	48,780	47,780	47,830	50,330	51,000	49,000	56,080
22	48,030	48,370	48,530	52,590	52,650	51,000	49,000	45,160	56,040	49,000	50,000	55,150
23	48,090	51,000	50,000	48,410	48,330	47,110	48,600	50,100	64,170	49,000	51,020	51,000
24	50,000	48,540	51,000	47,490	48,030	47,650	53,000	48,270	56,670	50,000	49,000	49,000
25	49,000	50,510	57,000	48,380	48,780	48,860	50,000	48,340	47,910	50,000	61,000	48,190
26	50,000	55,720	50,000	47,450	48,100	48,440	50,000	50,000	48,660	49,000	51,000	51,140
27	50,000	56,050	50,000	48,150	48,340	48,090	48,990	64,000	50,000	53,000	48,150	48,260
28	50,000	50,000	48,040	50,800	45,300	48,680	48,080	49,200	57,000	48,030	47,570	48,200
29	54,230	50,000	47,730	50,660	48,480	50,000	48,090	46,740	65,000	47,660	48,160	48,130
30	58,370		47,120	49,920	48,270	50,000	48,700	51,150	68,580	49,000	48,130	47,230
31	58,500		47,470		47,230		48,670	47,730		60,000		50,270

Total  
 Average  
 Min  
 Max

58,500	67,000	61,000	54,000	64,000	54,000	53,000	65,000	68,580	60,000	65,000	56,080
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**CoA Amount**    **118,000 m<sup>3</sup>/day**

**Yearly Average**  
**Yearly Min**  
**Yearly Max**                    **68,580**





85 Lappan's Ln  
 P.O. Box 790  
 Kingston, Ontario  
 K7L 4X7  
 (613) 546-1181

King St. Water Treatment Plant - Treated Water Flows 2020  
 m<sup>3</sup>

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	41,400	41,800	41,900	40,800	36,800	41,600	36,000	41,700	41,700	41,400	34,700	41,700
2	41,300	41,900	42,540	41,400	41,000	41,500	41,600	41,600	41,300	41,400	46,200	41,800
3	41,600	41,600	41,800	41,200	41,100	41,800	41,700	41,600	41,700	41,600	41,600	41,800
4	41,500	41,800	41,700	33,500	41,200	41,400	41,500	41,400	41,600	41,300	41,400	41,700
5	41,900	42,200	42,100	39,000	41,100	41,600	41,500	34,700	41,700	41,500	41,500	41,600
6	41,700	41,900	41,800	41,400	41,000	38,600	41,700	41,700	41,800	32,700	41,300	41,700
7	41,800	42,700	41,800	41,200	38,400	33,000	41,800	41,700	41,500	37,400	36,100	41,700
8	42,000	48,600	40,200	41,100	40,700	41,800	41,800	41,700	41,700	42,800	47,000	41,800
9	41,800	48,700	42,300	41,300	41,000	41,600	41,600	41,800	41,500	41,500	33,500	41,900
10	41,900	42,500	44,300	33,000	40,900	40,900	41,800	41,700	41,500	38,900	41,600	41,300
11	41,800	41,400	43,700	37,700	37,700	41,700	34,000	41,800	41,600	31,800	41,800	41,800
12	41,700	44,200	41,800	41,500	40,900	41,600	39,400	42,000	41,900	41,700	41,700	41,700
13	43,900	48,500	42,000	41,400	41,600	40,700	41,400	41,600	41,500	41,700	41,600	41,800
14	48,200	43,300	42,900	41,100	41,500	32,600	41,800	41,300	36,100	41,700	41,500	41,900
15	40,100	41,400	48,500	41,400	41,400	41,700	41,500	41,500	41,500	35,300	41,600	42,000
16	41,500	41,400	44,000	41,400	30,000	41,700	41,800	41,600	41,600	36,800	41,600	41,800
17	41,900	41,600	41,700	41,100	35,200	42,000	41,500	41,500	41,500	41,400	36,600	41,200
18	41,700	41,400	41,700	41,200	45,600	41,700	41,600	41,600	41,700	36,400	42,000	41,800
19	42,200	41,400	41,800	41,300	41,700	41,500	41,300	36,000	41,700	37,500	41,700	41,900
20	48,500	41,500	41,700	41,100	37,500	42,500	41,400	41,300	41,900	41,600	41,600	41,900
21	44,700	41,500	41,700	41,400	41,600	41,700	41,000	41,300	42,200	41,600	41,500	44,000
22	41,800	41,800	41,700	35,200	43,000	41,500	41,300	31,100	44,800	41,400	41,700	39,100
23	41,800	41,600	41,500	41,500	41,600	34,500	41,700	41,600	48,300	41,500	41,600	41,700
24	41,600	42,000	35,900	41,600	41,500	36,200	40,500	41,600	43,500	41,500	30,400	41,700
25	41,800	42,300	35,600	35,200	41,700	41,700	41,600	41,400	35,600	41,500	42,200	39,400
26	42,000	44,900	41,500	31,400	41,700	41,600	41,600	41,500	41,500	32,800	41,600	35,000
27	41,900	42,400	41,300	41,400	41,300	41,400	41,600	41,100	42,000	30,700	41,600	41,800
28	41,900	42,000	41,500	49,000	41,500	41,700	41,700	36,400	42,500	41,600	41,600	41,700
29	42,100	42,000	41,400	58,900	41,600	41,600	41,600	33,500	43,000	41,500	41,700	41,600
30	44,600		41,300	50,300	41,600	37,500	41,700	35,900	41,500	32,300	41,800	36,200
31	47,000		41,200		33,300		41,700	41,500		41,500		38,200
Total	1,319,600	1,198,300	1,294,840	1,229,000	1,246,700	1,210,900	1,272,700	1,246,700	1,251,900	1,214,300	1,222,300	1,275,200
Average	42,568	42,769	41,769	40,967	40,216	40,363	41,055	40,216	41,730	39,171	40,743	41,135
Min	40,100	41,400	35,600	31,400	30,000	32,600	34,000	31,100	35,600	30,700	30,400	35,000
Max	48,500	48,700	48,500	58,900	45,600	42,500	41,800	42,000	48,300	42,800	47,000	44,000

**CoA Amount**     **118,000 m<sup>3</sup>/day**

**Yearly Average**             **41,059**  
**Yearly Min**                     **30,000**  
**Yearly Max**                     **58,900**



85 Lappan's Ln  
 P.O. Box 790  
 Kingston, Ontario  
 K7L 4X7  
 (613) 546-1181

King St. Water Treatment Plant - Peak (Treated) Flows 2020  
 m<sup>3</sup>

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	42,910	44,870	43,570	46,010	37,960	42,810	44,890	42,640	43,060	42,700	49,480	42,580
2	55,570	47,310	41,700	44,680	48,790	42,790	43,030	42,700	42,730	43,000	50,640	51,130
3	47,100	47,580	42,590	44,920	41,290	42,560	42,820	42,960	42,590	42,830	42,690	42,950
4	42,750	48,640	44,500	49,130	42,090	52,960	4,233	42,790	43,030	42,810	49,970	42,690
5	42,980	57,050	48,190	49,360	42,170	43,020	42,520	42,570	42,960	42,850	42,810	42,740
6	42,950	47,680	47,540	46,140	42,310	47,520	42,630	45,660	42,940	42,070	42,780	42,570
7	46,460	49,280	49,320	42,600	46,640	43,590	42,970	42,500	42,830	57,530	49,480	46,310
8	43,140	50,340	49,340	42,150	41,850	42,740	51,530	43,060	42,850	47,510	51,070	43,080
9	45,030	50,410	51,840	42,300	41,940	42,810	42,600	42,740	42,940	42,670	42,550	42,840
10	47,020	47,450	52,520	42,330	41,820	42,930	42,970	42,710	42,840	42,580	42,530	50,300
11	46,640	42,310	50,010	45,850	41,500	43,000	42,600	42,610	43,030	45,500	46,070	43,040
12	44,630	51,300	42,640	42,560	53,880	42,540	44,370	43,420	43,050	42,780	42,720	43,110
13	49,930	53,040	46,850	42,680	42,990	42,670	43,150	42,730	42,940	42,730	42,430	43,230
14	50,590	49,990	50,430	42,720	43,100	42,650	43,200	42,640	42,200	51,900	42,950	45,170
15	49,230	43,790	50,830	42,460	42,780	43,000	42,880	42,860	42,920	41,780	42,670	43,170
16	42,760	45,500	49,710	46,410	35,320	42,710	42,730	42,850	43,050	42,530	43,040	43,130
17	42,680	43,960	42,760	42,400	48,770	48,460	4,281	42,930	42,790	42,240	46,780	49,240
18	42,560	42,610	51,010	42,170	50,490	42,670	42,850	42,580	44,210	41,700	46,900	43,050
19	46,790	42,510	49,910	41,960	42,840	42,580	42,650	42,340	43,120	42,700	42,930	42,990
20	50,610	42,750	48,650	48,040	46,350	48,550	42,660	42,680	42,850	43,050	43,070	43,130
21	50,430	48,440	42,880	50,850	51,080	42,810	41,970	42,270	46,930	42,850	43,040	50,530
22	42,710	45,360	42,990	55,280	49,490	42,960	42,330	41,190	50,170	42,960	43,080	49,590
23	42,710	44,880	46,220	47,770	42,550	42,170	42,830	42,370	50,230	42,970	45,370	43,100
24	42,990	42,790	42,900	42,670	42,660	49,140	43,020	42,400	49,560	42,840	42,760	43,040
25	42,950	44,940	47,150	42,260	43,070	43,010	42,900	42,310	44,320	42,790	56,300	42,840
26	45,150	50,560	42,720	42,340	42,780	42,500	43,070	42,600	43,800	42,310	43,110	42,430
27	47,210	48,700	44,550	45,740	42,650	42,630	42,680	49,540	43,040	49,790	42,700	42,860
28	42,980	45,210	42,320	76,420	42,730	42,650	42,670	42,320	48,510	42,610	42,640	42,890
29	57,690	44,690	42,270	68,290	42,600	42,780	42,950	42,110	50,130	42,760	42,720	42,790
30	50,610		42,260	71,370	43,060	42,400	42,630	42,450	43,270	42,090	42,700	42,120
31	50,950		42,310		4,250		42,640	42,600		50,920		42,610

Total  
 Average  
 Min  
 Max

57,690	57,050	52,520	76,420	53,880	52,960	51,530	49,540	50,230	57,530	56,300	51,130
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CoA Amount **118,000 m<sup>3</sup>/day**

Yearly Max **76,420**



85 Lappan's Ln  
 P.O. Box 790  
 Kingston, Ontario  
 K7L 4X7  
 (613) 546-1181

King St. Water Treatment Plant - Net to Distribution System 2020  
 m<sup>3</sup>

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	41,884	44,887	42,543	41,224	42,729	40,885	41,810	41,554	41,051	40,512	39,709	41,627
2	40,962	42,112	43,666	39,254	39,794	39,340	41,719	41,514	44,798	42,500	40,006	43,152
3	42,932	42,594	43,099	41,591	40,027	42,019	39,534	41,004	43,158	39,454	40,765	42,211
4	39,518	42,569	41,601	37,892	41,545	41,904	41,421	40,274	42,786	41,910	42,281	41,137
5	44,007	41,319	42,816	38,874	38,940	41,958	39,638	38,801	39,600	40,460	42,269	41,620
6	44,045	43,126	40,806	41,195	40,477	37,467	43,005	40,521	40,846	38,139	41,850	40,971
7	43,251	43,508	42,244	39,186	41,103	37,677	42,469	44,555	42,991	39,812	41,241	42,164
8	42,610	45,307	39,968	41,325	38,679	40,184	41,621	42,482	40,421	45,583	42,204	43,032
9	42,940	45,547	43,923	40,247	40,364	42,276	43,535	40,177	41,189	39,201	39,290	43,252
10	40,542	45,163	44,572	38,943	40,416	41,174	41,615	41,455	41,374	37,423	41,236	40,300
11	42,396	43,633	42,773	36,726	42,828	40,925	35,133	41,502	43,157	37,133	39,355	42,979
12	42,396	45,200	42,171	40,990	40,628	40,527	40,964	44,809	43,099	39,395	40,812	42,985
13	43,277	44,823	43,829	40,691	39,752	42,078	39,552	43,356	37,658	41,197	41,070	40,541
14	44,715	42,737	42,516	40,351	40,904	34,376	40,495	39,836	40,181	40,302	40,838	44,146
15	43,340	42,513	44,863	40,956	39,757	41,607	42,163	40,665	40,202	37,586	41,911	42,219
16	42,997	41,042	43,649	42,202	34,836	40,879	42,204	42,249	43,296	39,324	39,838	41,005
17	42,258	40,673	42,899	40,179	36,340	40,377	40,023	42,136	41,142	39,101	35,918	42,684
18	41,283	42,288	42,594	40,524	42,698	41,740	42,117	39,666	42,230	39,441	41,285	42,913
19	42,949	43,447	41,780	41,956	40,865	40,712	39,081	37,418	40,541	40,614	40,633	42,026
20	46,446	42,189	41,548	40,338	40,143	40,413	44,587	40,114	43,811	41,183	42,057	42,589
21	44,091	40,586	40,693	41,652	41,050	42,654	42,544	38,425	45,890	39,699	42,408	39,985
22	43,986	41,422	40,249	40,487	41,132	41,772	42,665	37,718	45,171	40,976	41,481	40,306
23	42,926	42,275	41,951	39,817	42,514	37,183	41,044	40,765	44,643	40,725	39,354	42,217
24	43,236	43,908	38,464	39,944	42,149	39,519	40,758	41,487	45,170	40,950	40,073	41,607
25	42,164	43,678	38,482	37,115	41,773	41,766	40,832	40,380	41,331	40,579	39,669	39,831
26	42,331	45,649	40,546	34,408	40,163	39,202	42,720	40,930	40,652	36,126	43,164	38,213
27	41,662	43,010	41,605	40,791	41,804	41,672	42,687	38,589	44,312	34,695	41,812	40,316
28	43,172	42,729	40,745	48,073	41,977	41,733	42,071	40,474	42,500	38,281	42,104	40,216
29	42,087	40,211	41,387	57,476	42,561	39,732	40,673	34,673	41,138	39,837	41,534	40,838
30	44,640		40,379	50,393	40,321	37,010	40,031	34,535	41,679	37,693	40,826	39,705
31	44,569		41,498		37,109		42,840	39,294		38,605		38,810
Total	1,329,609	1,207,932	1,299,855	1,234,797	1,255,379	1,210,757	1,281,544	1,251,357	1,266,014	1,228,431	1,226,991	1,285,595
Average	42,891	43,039	41,931	41,160	40,496	40,359	41,340	40,366	42,200	39,627	40,900	41,471
Min	39,518	40,586	38,464	34,408	34,836	34,376	35,133	34,535	37,658	34,695	35,918	38,213
Max	46,446	45,649	44,863	57,476	42,828	42,654	44,587	44,809	45,890	45,583	43,164	44,146

**Yearly Average 41,315**  
**Yearly Min 34,376**  
**Yearly Max 57,476**



85 Lappan's Ln  
 P.O. Box 790  
 Kingston, Ontario  
 K7L 4X7  
 (613) 546-1181

Kingston Central Water Treatment Plant - City East Flows 2020  
 m<sup>3</sup>

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	7,163	8,508	7,291	6,531	6,759	8,123	9,134	6,055	5,255	6,017	6,389	6,320
2	6,653	7,440	8,440	7,316	8,442	5,628	7,943	7,838	7,404	5,743	6,181	7,576
3	7,056	8,228	7,657	8,476	6,395	8,698	9,133	6,116	7,705	5,208	6,284	6,636
4	6,130	7,781	6,569	7,591	8,600	6,937	8,457	6,960	5,891	7,088	6,341	6,383
5	7,709	7,398	8,729	7,393	7,150	8,007	9,217	7,485	6,457	6,473	6,297	6,474
6	7,721	9,269	6,579	7,962	7,876	7,457	9,070	7,104	6,375	5,834	6,157	6,712
7	6,493	7,007	7,961	6,571	6,117	7,464	5,607	8,429	6,663	6,099	6,511	7,407
8	6,761	8,423	8,174	8,240	7,919	7,962	10,104	8,302	6,482	5,836	6,601	6,998
9	7,514	7,858	7,661	6,817	7,816	8,550	9,555	8,049	7,019	5,754	6,349	6,246
10	6,105	7,954	7,806	8,338	7,769	7,782	10,054	6,414	5,141	4,722	6,136	7,030
11	7,993	7,876	8,581	7,023	7,535	7,824	6,681	8,737	7,523	5,930	6,034	6,501
12	6,805	8,078	7,554	8,160	7,198	7,723	7,724	9,208	5,791	6,596	6,751	7,184
13	8,555	8,399	7,309	6,528	7,178	9,225	6,962	8,387	4,348	6,559	6,135	6,417
14	7,631	7,438	8,387	7,672	7,349	8,080	8,269	8,340	5,878	6,056	5,619	7,811
15	7,613	8,011	7,326	6,938	8,289	10,160	8,456	7,782	5,909	5,499	7,553	6,697
16	6,593	8,420	7,723	8,757	6,919	9,446	8,163	8,445	6,623	6,479	5,122	6,367
17	7,516	7,300	8,159	6,284	8,228	8,691	5,935	7,516	7,200	6,044	6,715	7,478
18	7,432	7,747	7,214	8,020	7,343	9,534	8,410	7,307	6,319	6,139	6,520	7,224
19	7,337	8,572	7,987	8,334	7,926	9,218	7,882	6,569	6,208	6,022	6,654	7,189
20	7,709	6,808	8,654	6,226	7,718	9,605	7,941	7,066	7,323	6,039	6,765	6,833
21	7,496	8,438	7,297	7,602	9,162	9,316	7,739	5,959	10,513	6,026	7,044	6,357
22	8,370	8,711	7,439	8,469	7,684	10,741	7,151	6,953	10,616	5,928	6,073	6,819
23	7,150	7,995	7,875	7,471	9,644	8,754	7,873	6,599	6,730	5,714	6,446	7,130
24	7,828	8,302	8,841	6,631	8,372	8,744	7,621	7,810	5,577	6,124	6,877	7,340
25	7,037	9,215	6,901	7,265	8,867	8,079	7,893	5,676	6,269	5,747	6,895	7,339
26	8,184	12,762	8,160	7,313	7,279	9,911	8,805	7,416	5,984	6,512	6,973	7,083
27	6,920	7,048	8,100	7,827	8,947	8,130	9,625	4,660	8,192	5,975	6,248	6,873
28	8,858	8,696	7,517	9,001	8,307	8,379	7,771	7,207	6,879	6,196	7,490	6,979
29	7,324	6,917	7,664	8,450	8,015	8,416	8,548	5,962	6,121	6,358	6,883	6,985
30	8,858		7,634	6,289	7,877	6,830	10,195	6,584	6,013	6,451	6,559	6,947
31	7,288		8,221		7,702		8,338	6,104		6,161		7,808
Total	229,800	236,596	241,408	225,493	242,380	253,412	256,254	223,039	200,410	187,325	194,598	215,144
Average	7,413	8,158	7,787	7,516	7,819	8,447	8,266	7,195	6,680	6,043	6,487	6,940
Min	6,105	6,808	6,569	6,226	6,117	5,628	5,607	4,660	4,348	4,722	5,122	6,246
Max	8,858	12,762	8,841	9,001	9,644	10,741	10,195	9,208	10,616	7,088	7,553	7,811

**Yearly Average**                    **7,396**  
**Yearly Min**                         **4,348**  
**Yearly Max**                         **12,762**



**Utilities**  
Kingston

**ANNUAL SUMMARY REPORT**  
**2020**

**POINT PLEASANT**  
**WATER TREATMENT PLANT**

WATERWORKS NUMBER: 220001851

**Reporting Period**

**January 1, 2020 – December 31, 2020**

Submitted by:  
Jim Keech, Professional Engineer  
President & C.E.O.



**ANNUAL SUMMARY REPORT  
2020  
POINT PLEASANT WATER TREATMENT PLANT**

WATERWORKS NUMBER: 220001851

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 Municipal Drinking Water Licence (MDWL) issued for the Point Pleasant Water Treatment Plant, to comment on any incidents of non-compliance during the reporting period, to summarize the quantities of the water supplied and to compare the summaries to the rated capacity and flow rates approved in the system's permits and approvals 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, and 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.

**Non-Compliance with Terms and Conditions of the DWWP/MDWL**

There were no incidents of non-compliance during this reporting period.



## **Compliance with the Terms and Conditions of the DWWP/MDWL**

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 Licence (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 licences 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.

### **Notifications of Adverse Water Quality Results**

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, 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 more closely monitor the parameter for a period of time.

There were no events within the PPWTP requiring notification during this reporting period.





## **Summary of the Quantity of Water Supplied During the Reporting Period**

Listed in Tables 3 & 4 following this report are the treated water flows for the Point Pleasant Water Treatment Plant for the year 2020. The serviced population for the King Street WTP and Point Pleasant WTP is 123,798 (population estimate based on growth rates from Census data for 2016). The annual average daily use was 18,191 cubic meters per day from the Point Pleasant WTP and 41,059 cubic meters per day from the King Street WTP for the year of 2020. Total average per capita use was calculated at 478 litres per person/day. The metered residential use for 2020 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. Leak detection surveys are typically undertaken on a bi-annual basis or when system losses become noticeably high.

## **Summary of Flow Rate Exceedances**

There were no instances during this reporting period where flows at the Point Pleasant WTP exceeded the daily maximum allowable flow rate of 80,000 m<sup>3</sup>/d. Listed in Tables 1 & 2 following this report are the raw water flows (water taken from Lake Ontario) for the Point Pleasant Water Treatment Plant for the year 2020.

## **Summary of 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 2.65 mg/l. Residuals are routinely measured in the distribution system and the treatment plant chlorine dosages are adjusted as required to meet the distribution system target residuals and the required CT values.



Typical PACl dosage for this treatment plant is 7mg/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.

### 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 [www.utilitieskingston.com](http://www.utilitieskingston.com) or available at Kingston City Hall or the Utilities Kingston offices. For further information about this report or any questions regarding accessibility contact Megan Lockwood at [mlockwood@utilitieskingston.com](mailto:mlockwood@utilitieskingston.com) , or call 613-546-1181 Ext 2 2 9 1.



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Point Pleasant Water Treatment Plant - Raw Water Flows 2020  
 m<sup>3</sup>

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	14,911	16,765	20,556	12,231	20,597	17,752	22,681	19,829	17,172	16,915	19,037	16,073
2	14,291	19,404	17,320	16,125	19,739	17,112	22,273	18,217	15,660	12,844	18,218	15,077
3	15,767	18,131	16,703	13,515	12,832	15,531	27,151	19,108	20,095	15,342	17,572	15,677
4	17,407	16,841	19,265	18,646	15,606	17,174	24,795	19,275	18,763	15,571	15,902	17,020
5	17,277	20,515	21,070	15,819	15,052	17,554	30,042	22,210	20,303	16,815	16,193	16,697
6	15,979	18,261	20,695	13,806	15,572	20,721	22,928	20,276	18,091	16,760	17,882	16,941
7	14,450	15,125	20,051	15,671	16,608	21,170	32,059	17,217	17,416	16,619	17,154	17,707
8	20,638	16,506	20,033	16,264	17,515	18,564	31,153	22,414	20,078	17,567	17,457	16,329
9	19,272	15,610	15,137	13,334	14,183	18,544	30,134	24,828	19,006	14,232	18,410	18,046
10	17,354	13,479	17,540	14,323	13,165	19,794	30,879	20,557	21,178	15,858	18,084	18,610
11	17,612	17,922	20,289	18,737	15,549	18,862	27,834	25,845	15,052	16,943	19,175	12,245
12	19,432	14,012	17,489	13,553	17,237	20,919	16,841	23,426	13,542	15,498	17,646	15,462
13	16,768	14,452	16,260	13,042	13,159	17,515	20,753	24,961	20,410	14,249	16,202	16,206
14	16,392	16,562	19,889	13,226	16,717	24,448	21,333	28,436	18,158	15,058	16,815	14,552
15	13,040	17,233	16,127	14,920	16,078	23,860	21,146	25,287	18,456	16,983	17,667	15,871
16	14,359	15,437	16,131	14,550	19,836	25,608	18,416	23,075	16,194	18,497	17,607	17,445
17	18,675	17,771	13,920	13,058	23,253	13,849	20,820	17,545	21,779	17,918	16,748	16,608
18	18,300	14,755	14,758	15,219	14,340	24,476	19,350	22,452	15,853	15,676	17,230	13,093
19	16,917	15,302	15,434	15,898	17,539	29,713	25,631	22,525	18,725	15,606	17,118	15,729
20	14,514	17,936	15,813	13,288	18,802	29,767	18,143	22,491	16,355	15,077	13,016	15,838
21	15,431	17,019	16,509	14,390	21,713	25,690	21,316	22,593	17,344	18,228	15,395	16,603
22	16,908	19,604	16,676	15,477	19,402	31,217	16,582	21,797	20,555	14,069	14,946	16,121
23	16,012	17,352	13,537	16,023	23,274	32,634	22,428	19,236	15,891	14,476	18,394	14,470
24	16,276	14,928	19,991	16,766	21,494	24,165	23,382	25,666	16,157	15,073	16,434	15,380
25	16,758	18,793	17,703	18,626	19,179	23,286	23,823	23,576	18,205	13,292	18,813	15,119
26	18,908	20,673	16,288	23,037	22,237	28,789	22,654	19,254	19,437	19,179	14,942	17,119
27	18,684	14,753	15,615	14,917	21,998	19,524	27,819	18,036	16,266	21,452	15,361	14,359
28	17,990	18,344	14,964	16,772	18,469	20,105	24,456	18,159	20,733	19,166	16,974	16,532
29	17,832	19,285	14,200	16,285	16,137	22,290	27,742	19,533	17,761	15,669	17,366	15,895
30	17,103		15,395	14,924	18,889	22,765	30,220	29,882	15,764	17,130	17,128	15,322
31	16,344		16,748		18,969		21,390	17,657		17,159		17,922
Total	521,601	473,485	532,106	462,442	555,140	663,398	746,174	675,363	540,399	504,921	510,886	496,068
Average	16,826	16,992	17,165	15,415	17,908	22,113	24,070	21,786	18,013	16,288	17,030	16,002
Min	13,040	13,479	13,537	12,231	12,832	13,849	16,582	17,217	13,542	12,844	13,016	12,245
Max	20,638	20,673	21,070	23,037	23,274	32,634	32,059	29,882	21,779	21,452	19,175	18,610

**PTTW Amount**      **90,000 m<sup>3</sup>/day**

**Yearly Average**                      **18,301**  
**Yearly Min**                                **12,231**  
**Yearly Max**                                **32,634**



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Point Pleasant Water Treatment Plant - Peak (Raw) Flows 2020  
m<sup>3</sup>

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	37,639	26,453	31,432	25,827	31,574	36,022	31,119	31,506	32,621	32,168	30,895	44,517
2	26,772	31,543	26,796	26,461	45,317	35,931	44,907	26,544	36,107	25,917	31,121	31,197
3	45,909	30,892	35,806	25,269	26,196	31,299	44,565	36,538	36,344	25,950	31,465	31,543
4	35,098	31,285	39,721	39,142	26,078	35,829	43,753	36,582	30,100	26,182	35,412	35,357
5	35,755	30,762	31,320	31,065	35,980	31,273	40,296	36,270	27,134	26,050	26,112	21,853
6	44,499	39,554	31,604	45,830	30,030	31,087	34,310	43,671	37,755	25,689	30,714	31,236
7	27,410	25,831	35,949	26,289	32,047	31,738	43,798	34,317	26,925	32,904	39,515	35,495
8	35,584	26,707	39,610	39,135	31,422	31,448	43,584	38,068	26,874	35,625	35,539	31,183
9	35,552	26,501	34,012	29,714	30,760	31,434	43,553	46,463	26,881	25,843	35,136	42,042
10	31,146	25,647	43,748	26,488	23,339	31,425	46,928	41,651	26,784	26,526	35,524	41,087
11	30,948	28,538	37,571	31,699	31,220	31,702	47,260	37,977	25,613	26,644	38,245	29,737
12	31,284	38,072	30,495	13,453	31,201	36,476	27,129	40,967	26,315	34,689	38,132	42,328
13	31,538	19,902	31,282	23,451	35,888	40,859	27,159	40,699	26,409	30,727	26,169	42,059
14	30,661	27,267	31,296	25,294	36,037	46,072	27,326	39,671	29,542	29,691	26,186	29,978
15	33,820	43,705	26,549	26,309	30,141	46,584	33,429	46,089	29,328	28,076	25,783	26,316
16	26,579	36,220	26,402	30,317	38,023	45,456	37,967	45,994	39,636	26,126	26,232	39,169
17	38,526	31,443	35,445	21,905	41,803	41,660	32,465	44,305	29,610	26,329	26,013	26,044
18	29,538	26,271	43,614	29,348	46,440	46,670	30,122	29,975	31,149	26,194	29,006	26,491
19	29,487	29,194	36,005	31,659	39,443	41,495	39,304	39,000	31,140	26,056	26,428	26,423
20	38,676	29,804	29,875	26,153	37,850	40,551	38,938	31,013	31,495	26,166	25,966	26,397
21	29,461	31,461	26,320	26,182	27,220	45,760	34,267	35,948	35,008	28,646	28,830	43,129
22	31,563	38,984	26,335	26,892	29,923	45,638	30,081	35,613	43,516	28,744	29,005	28,810
23	30,963	39,814	23,621	26,786	45,617	45,768	30,003	35,657	31,322	25,950	28,195	31,064
24	26,071	29,607	39,112	37,739	34,163	45,513	40,191	44,359	29,887	26,254	26,543	31,439
25	29,505	29,534	31,361	39,599	39,598	40,069	35,931	44,402	43,825	28,983	25,799	25,949
26	28,860	29,575	32,505	41,573	40,007	45,118	31,102	44,050	35,876	39,337	26,511	35,178
27	29,719	25,936	28,896	47,084	40,039	44,772	44,591	35,688	31,392	29,932	43,166	26,408
28	29,743	31,309	23,536	47,739	39,981	44,823	35,846	31,583	36,023	35,580	39,206	35,206
29	39,793	31,345	35,887	32,634	45,358	44,754	36,189	36,223	31,338	25,920	43,090	35,143
30	29,574		35,741	28,801	44,787	35,913	45,152	43,621	30,229	26,446	42,880	31,240
31	29,375		35,785		44,733		45,071	43,588		26,299		35,407
Total												
Average												
Min												
Max	45,909	43,705	43,748	47,739	46,440	46,670	47,260	46,463	43,825	39,337	43,166	44,517

*PTTW Amount* **62,500 litres/ minute**  
*or* **80,640 m<sup>3</sup>/day**  
**Yearly Average**  
**Yearly Min**  
**Yearly Max** **47,739**



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Point Pleasant Water Treatment Plant - Treated Water Flows 2020  
 m<sup>3</sup>

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	14,656	16,387	20,572	11,939	20,031	17,625	22,476	19,810	17,077	16,519	19,035	15,985
2	13,952	19,846	17,900	16,242	19,986	17,155	21,929	17,795	16,596	13,393	17,554	15,182
3	15,563	17,907	16,202	13,561	12,551	15,553	26,779	19,029	18,586	15,110	16,786	14,994
4	17,096	16,747	18,764	18,141	15,677	17,002	24,444	19,266	19,171	15,648	13,642	17,323
5	16,688	20,574	20,346	16,444	15,102	17,679	29,223	21,400	19,277	17,442	14,360	17,199
6	15,383	18,135	20,555	14,360	15,606	20,557	23,508	20,667	18,217	16,965	16,966	16,598
7	15,328	15,049	20,115	15,445	16,435	20,571	31,277	17,372	17,064	16,870	15,431	17,834
8	18,830	16,473	20,163	16,210	17,630	18,707	30,336	21,517	19,683	17,331	15,835	16,569
9	19,369	15,692	14,970	13,275	14,432	18,492	29,760	24,451	18,466	15,296	17,668	18,518
10	17,334	14,149	17,138	14,700	13,392	19,134	30,311	19,611	21,078	15,622	16,823	18,207
11	17,304	17,798	20,017	18,358	15,585	19,171	27,252	25,535	14,811	16,774	18,430	12,809
12	19,628	13,638	17,948	13,507	17,618	20,039	16,508	23,266	14,328	15,882	16,405	15,719
13	17,236	15,042	16,108	13,246	14,050	17,818	20,709	24,135	19,655	14,794	14,327	16,533
14	15,703	16,618	19,479	13,339	16,566	24,086	21,311	27,437	18,416	15,334	14,649	14,609
15	14,295	16,972	16,060	14,795	16,194	23,545	20,509	25,230	18,799	17,267	16,876	15,808
16	14,086	15,735	15,998	14,664	19,956	24,880	17,837	22,587	16,008	18,941	16,315	17,561
17	18,525	17,559	14,272	13,348	22,884	28,973	19,935	17,427	20,951	17,400	16,905	16,570
18	18,581	14,656	14,881	15,256	13,851	24,730	19,624	21,507	16,121	16,096	17,308	13,395
19	16,641	15,303	15,565	14,815	17,498	29,058	25,198	22,507	18,115	15,948	17,115	15,571
20	14,854	18,076	16,054	13,699	19,096	28,966	17,930	22,131	16,766	15,415	13,615	15,587
21	14,598	16,895	16,723	14,046	21,501	25,774	21,070	22,374	17,411	18,095	15,532	17,144
22	16,761	19,203	16,856	15,643	19,509	30,432	16,061	21,035	21,125	14,678	14,902	16,406
23	16,253	17,661	14,022	15,639	23,605	31,800	22,116	19,065	16,141	15,101	18,496	15,041
24	16,259	14,894	19,458	16,477	21,618	24,050	22,948	25,239	15,678	14,962	16,193	15,101
25	16,791	18,469	17,515	18,252	19,167	22,682	23,119	23,311	17,983	13,578	19,103	15,264
26	18,863	20,582	16,185	22,192	22,137	28,604	22,484	18,526	19,110	19,239	15,175	16,894
27	18,847	14,561	15,279	14,512	21,908	19,310	26,950	17,722	16,189	21,576	15,522	14,338
28	17,832	18,033	14,674	15,917	18,601	19,849	24,471	18,103	20,444	19,023	16,660	16,901
29	17,726	18,847	14,672	15,772	16,265	21,530	27,498	19,037	17,587	15,802	18,086	16,075
30	17,110		15,469	14,056	18,870	22,402	29,697	29,126	15,755	16,770	17,177	15,242
31	16,175		16,231		19,244		20,651	17,463		17,335		18,532
Total	518,267	472,654	530,191	457,850	556,565	670,174	733,921	663,681	536,608	510,206	492,891	499,509
Average	16,718	16,948	17,103	15,262	17,954	22,339	23,675	21,409	17,887	16,458	16,430	16,113
Min	13,952	13,638	14,022	11,939	12,551	15,553	16,061	17,372	14,328	13,393	13,615	12,809
Max	19,628	20,582	20,572	22,192	23,605	31,800	31,277	29,126	21,125	21,576	19,103	18,532

**CoA Amount**      **45,455 m<sup>3</sup>/day**

**Yearly Average**                      **18,191**  
**Yearly Min**                              **11,939**  
**Yearly Max**                              **31,800**



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Point Pleasant Water Treatment Plant - Peak (Treated) Flows 2020  
 m<sup>3</sup>

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	30,834	23,244	23,320	24,531	30,691	28,499	29,272	26,741	27,195	24,559	29,424	32,730
2	24,508	23,154	26,796	22,554	30,001	24,534	30,647	26,483	30,594	25,872	22,019	27,353
3	34,303	25,511	30,679	27,210	27,076	27,509	34,400	26,708	28,649	19,608	26,516	21,894
4	32,560	23,364	28,496	25,254	26,716	26,039	34,099	31,056	30,931	22,976	25,846	27,146
5	34,485	23,629	23,451	31,134	30,133	22,230	34,374	34,925	24,559	25,500	21,731	22,336
6	32,513	31,269	27,194	28,786	28,621	23,409	34,310	34,545	30,728	25,818	22,469	26,463
7	23,265	27,486	29,300	26,997	26,949	22,981	35,072	32,492	24,505	27,046	30,460	34,036
8	34,961	24,432	30,889	25,691	23,082	26,067	34,356	28,468	24,603	27,141	34,085	26,808
9	32,566	26,935	34,012	24,958	22,961	26,914	34,609	30,806	26,697	24,592	32,467	30,728
10	24,739	24,591	32,504	22,180	23,080	31,205	34,013	29,762	26,964	22,023	27,251	30,511
11	23,562	26,753	30,675	26,862	23,501	31,107	34,539	30,707	20,891	23,243	30,818	30,318
12	23,340	25,457	30,490	22,994	23,130	26,955	25,884	34,151	26,521	31,288	28,510	34,191
13	23,237	19,909	28,528	20,718	34,707	30,930	27,235	34,177	25,296	31,288	24,454	30,807
14	23,128	30,322	29,459	23,600	32,647	30,489	26,274	33,576	25,784	28,674	26,998	28,491
15	22,910	33,958	24,276	26,903	30,878	34,375	33,691	34,604	30,871	23,632	23,502	26,244
16	18,102	26,493	26,822	27,187	30,883	34,636	30,282	33,753	30,776	26,038	23,788	26,821
17	26,744	26,310	34,734	20,468	30,854	32,518	30,210	34,017	26,857	23,314	27,344	23,681
18	31,602	24,102	32,721	26,305	28,527	33,755	30,626	26,991	25,470	27,045	26,849	20,454
19	28,471	31,202	27,420	23,662	27,070	34,394	34,613	29,891	23,517	24,520	26,978	19,752
20	24,473	31,296	31,233	18,710	30,331	34,518	34,790	30,858	26,959	23,590	24,443	19,843
21	26,454	24,404	26,145	22,666	26,290	34,464	32,798	27,104	30,184	23,069	22,034	30,386
22	23,323	25,692	20,677	25,903	30,113	34,684	28,526	30,840	30,542	21,942	23,437	30,206
23	23,305	30,773	18,200	19,223	34,388	33,587	27,347	30,641	30,225	23,571	23,153	29,925
24	20,510	28,392	26,891	23,407	34,404	35,185	30,794	33,270	30,209	27,202	24,999	22,861
25	22,943	24,316	24,527	30,856	34,155	30,736	26,799	33,366	28,529	12,997	25,300	26,416
26	25,602	23,793	27,215	30,814	31,222	30,754	26,807	30,444	27,338	30,530	23,227	26,691
27	26,895	23,652	26,752	35,238	31,065	34,697	33,521	25,699	26,559	30,308	30,078	26,905
28	30,759	21,619	23,015	34,882	30,646	32,513	34,571	23,629	30,988	28,405	30,188	27,161
29	28,502		27,035	12,923	34,834	28,434	34,065	29,530	28,543	27,148	30,374	26,877
30	26,946		27,079	27,047	32,493	26,632	34,645	34,545	30,794	21,759	34,763	30,897
31	24,430		30,990		30,815		34,006	32,422		25,304		28,498

Total  
 Average  
 Min  
 Max

34,961	33,958	34,734	35,238	34,834	35,185	35,072	34,925	30,988	31,288	34,763	34,191
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**CoA Amount**      **45,455 m<sup>3</sup>/day**

**Yearly Average**  
**Yearly Min**  
**Yearly Max**                      **35,238**



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Point Pleasant Water Treatment Plant - Net to Distribution System 2020  
 m<sup>3</sup>

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	13,392	16,577	19,492	11,772	19,325	16,782	21,831	17,927	18,157	16,122	18,102	14,731
2	13,856	18,586	16,831	15,546	18,915	16,713	20,792	18,061	15,366	13,061	17,394	15,450
3	14,580	16,216	15,775	12,977	12,711	14,971	25,620	18,453	18,501	14,702	14,808	14,933
4	16,029	17,235	17,857	17,615	14,464	16,707	24,509	17,541	18,501	15,064	14,059	16,981
5	16,958	19,493	19,691	15,556	14,791	16,687	28,205	20,660	18,501	16,475	14,247	16,467
6	15,077	17,522	18,635	13,634	15,640	20,358	25,036	20,552	18,501	16,450	15,725	15,342
7	14,877	14,464	21,151	14,660	15,788	19,474	30,598	16,607	16,462	16,297	14,788	17,175
8	17,617	16,726	18,787	15,817	16,918	18,873	29,080	22,118	19,420	16,714	15,452	15,231
9	18,467	15,093	13,931	12,910	14,085	17,517	29,446	23,000	18,259	15,014	17,242	18,680
10	16,869	13,611	17,221	14,242	12,714	19,157	28,855	18,477	18,934	15,014	16,060	17,927
11	17,682	16,317	19,280	17,359	15,113	17,850	26,416	25,648	15,068	15,907	17,673	11,735
12	18,564	13,192	17,738	12,979	16,723	20,212	15,552	22,123	14,950	15,146	16,023	15,052
13	16,352	14,770	15,859	13,349	13,906	17,061	18,818	24,639	18,288	14,716	13,807	15,877
14	14,884	15,752	19,305	12,646	15,289	26,668	21,738	26,846	17,903	14,764	13,909	14,647
15	13,800	16,659	15,137	13,996	15,153	22,593	19,895	24,364	18,067	16,970	16,298	15,639
16	14,175	15,351	14,882	14,202	20,026	24,618	18,093	21,391	15,640	17,657	15,803	16,451
17	17,814	17,048	12,508	12,863	21,274	27,166	18,867	17,050	18,909	17,326	16,951	14,810
18	17,367	13,578	14,435	14,328	13,081	25,779	19,049	21,423	16,160	14,951	15,536	13,044
19	15,577	14,664	15,309	14,117	17,621	28,064	23,812	21,708	17,242	15,304	16,867	14,790
20	14,848	17,930	15,647	13,451	18,955	28,518	17,406	20,857	16,677	14,911	13,692	14,976
21	14,079	16,209	16,744	13,262	21,038	25,638	21,089	22,785	16,945	17,806	15,531	16,748
22	16,305	18,805	16,072	15,061	18,738	29,938	16,010	19,829	20,055	14,727	13,461	15,878
23	15,878	16,792	12,837	14,823	22,970	29,397	21,409	18,989	15,777	13,200	17,665	14,515
24	15,510	15,416	18,332	16,242	12,117	23,099	21,931	23,474	15,297	15,160	16,128	15,350
25	17,326	16,170	17,363	17,496	18,499	22,726	22,873	22,376	16,092	24,808	17,549	14,987
26	17,785	18,774	15,923	20,094	21,407	32,002	22,345	18,692	19,308	18,775	15,226	15,268
27	16,731	15,241	15,050	14,551	20,910	18,747	25,552	17,906	16,039	20,700	14,452	14,064
28	17,834	18,048	14,427	15,258	18,885	18,963	25,056	16,121	19,503	18,509	16,069	17,036
29	17,261	18,933	13,773	15,548	15,537	21,334	26,040	19,218	16,729	14,761	17,326	15,639
30	16,037		14,848		18,100	22,464	29,604	29,083	15,351	16,622	16,833	13,933
31												
Total	483,532	456,238	494,842	426,357	510,690	660,075	695,528	627,916	520,600	487,633	474,674	463,353
Average	16,118	16,385	16,495	14,702	17,023	22,002	23,184	20,931	17,353	16,254	15,822	15,445
Min		13,192				14,971			14,950		13,461	11,735
Max	18,564	19,493	21,151	20,094	22,970	32,002	30,598	29,083	20,055	24,808	18,102	18,680
							<b>Yearly Average</b>					
								<b>17,643</b>				
							<b>Yearly Min</b>					
							<b>Yearly Max</b>					
								<b>32,002</b>				



**Utilities**  
Kingston

**ANNUAL SUMMARY REPORT  
2020**

**CANA WATER TREATMENT SYSTEM**

WATERWORKS NUMBER: 220006053

**Reporting Period**

**January 1, 2020 – December 31, 2020**

Submitted by:  
Jim Keech, Professional Engineer  
President & C.E.O.





**ANNUAL SUMMARY REPORT**  
**2020**  
**CANA WATER TREATMENT SYSTEM**  
WATERWORKS NUMBER: 220006053

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 Licence (MDWL) issued for the Cana Water Treatment System, to comment on any incidents of non-compliance during the reporting period, to summarize the quantities of the water supplied and to 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 the operating authority.

**Non-Compliance with Terms and Conditions of the DWWP/MDWL**

There were no issues of non-compliance during this reporting period.

**Compliance with the Terms and Conditions of the DWWP/MDWL**

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 Drinking Water Works Permit (DWWP) and Municipal Drinking Water Licence (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), 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 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 Treatment 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 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/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 unmanned 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.

### **Notifications of Adverse Water Quality Results**

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 (MOH). 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 more closely monitor the parameter for a period of time. The details of any events requiring notifications are listed below.

-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 January 2018.

-Notification of an adverse water quality incident was provided to the Medical Officer of Health and Spills Action Centre on March 5, 2020. As a result of an extended power outage and failure of the backup generator system at the Cana Drinking Water System, the distribution system experienced a loss of pressure. 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.

### **Summary of the Quantity of Water Supplied During the Reporting Period**



Listed in Table 2 following this report are the treated water flows for the Cana Water Treatment System for the year 2020.

With an annual average daily use of 21.09 m<sup>3</sup>/d (cubic meters per day), the estimated per capita use is 254 litres per day. The typical Canadian average is 250 – 350 litres 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. Restrictions on water use have periodically been necessary to curb flows.

### **Flow Rate Exceedances**

There were no instances during this reporting period where flows exceeded the maximum allowable flow rates listed in our Municipal Drinking Water Licence. 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 for the year 2020.

### **Summary of Treatment Chemicals Used**

There is one treatment chemical in use in this system. Chlorine, in the form of 12% sodium hypochlorite, is used to disinfect 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 3.81 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 meet the distribution system target residual and the required CT value.

### **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 [www.utilitieskingston.com](http://www.utilitieskingston.com) or is available at Kingston City Hall, or the Utilities Kingston offices. For further information about this report or any questions regarding accessibility contact Megan Lockwood at [mlockwood@utilitieskingston.com](mailto:mlockwood@utilitieskingston.com) , or call 613-546-1181 Ext 2 2 9 1.



85 Lappan's Ln  
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Cana Well Supply - Daily Total -Raw Water Flows 2020  
 m<sup>3</sup>

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	26.33	18.67	22.00	23.00	26.00	21.50	26.00	25.25	20.00	27.00	22.67	18.50
2	26.33	18.67	19.00	23.00	26.00	21.50	26.00	25.25	23.00	21.33	21.50	21.50
3	22.33	17.00	19.00	20.33	26.00	30.50	41.00	25.25	23.00	21.33	21.50	21.50
4	22.33	17.00	15.00	20.33	48.00	30.50	41.00	23.00	21.67	21.33	19.00	21.67
5	22.33	18.50	15.00	20.33	48.00	25.33	41.00	20.00	21.67	22.00	19.00	21.67
6	16.50	18.50	20.00	23.50	20.40	25.33	27.50	20.00	21.67	22.00	24.33	21.67
7	16.50	21.33	20.00	23.50	20.40	25.33	27.50	25.00	22.50	20.50	24.33	22.00
8	17.00	21.33	20.00	10.00	20.40	25.50	33.50	25.00	22.50	20.50	24.33	22.00
9	17.00	21.33	21.00	19.00	20.40	25.50	33.50	25.00	24.50	24.75	19.50	18.50
10	16.33	18.00	21.00	19.00	20.40	29.00	29.00	27.00	24.50	24.75	19.50	18.50
11	16.33	18.00	17.00	19.00	21.50	29.00	29.00	27.00	22.33	24.75	18.50	22.00
12	16.33	19.17	17.00	19.50	21.50	31.33	29.00	21.00	22.33	24.75	18.50	22.00
13	17.50	19.17	20.00	19.50	20.00	31.33	21.50	21.00	22.33	25.00	22.00	22.00
14	17.50	19.17	20.00	19.00	20.00	31.33	21.50	28.67	22.50	21.00	22.00	20.00
15	20.50	19.17	20.00	15.50	23.25	32.00	24.00	28.67	22.50	20.00	22.00	20.00
16	20.50	19.17	23.00	15.50	23.25	32.00	24.00	28.67	23.00	22.33	22.50	20.00
17	16.67	19.17	23.00	18.67	23.25	29.50	23.67	24.50	23.00	22.33	22.50	20.00
18	16.67	16.00	19.50	18.67	23.25	29.50	23.67	24.50	22.33	22.33	24.00	26.00
19	16.67	18.50	19.50	18.67	36.00	42.00	23.67	21.50	22.33	21.50	24.00	26.00
20	16.50	18.50	18.33	19.50	30.00	42.00	30.00	21.50	22.33	21.50	25.00	26.00
21	16.50	19.33	18.33	19.50	30.00	42.00	17.00	24.67	23.50	22.60	25.00	19.00
22	16.50	19.33	18.33	19.00	28.00	25.00	29.00	24.67	23.50	22.60	25.00	19.00
23	16.50	19.33	17.00	19.00	28.00	25.00	29.00	24.67	25.50	22.60	20.50	18.00
24	18.67	18.50	17.00	23.00	28.00	35.50	32.33	18.50	25.50	22.60	20.50	24.00
25	18.67	18.50	19.00	23.00	29.50	35.50	32.33	18.50	26.00	22.60	22.00	24.00
26	18.67	18.50	19.00	23.00	29.50	27.33	32.33	22.50	26.00	22.00	22.00	21.33
27	20.00	18.50	21.33	20.00	41.00	27.33	23.00	22.50	26.00	22.00	23.33	21.33
28	20.00	22.00	21.33	20.00	14.00	27.33	23.00	22.67	19.00	21.50	23.33	21.33
29	12.50	22.00	21.33	22.00	28.33	30.00	22.00	22.67	19.00	21.50	23.33	19.00
30	12.50		14.00	22.00	28.33	26.00	22.00	22.67	27.00	22.67	18.50	19.00
31	18.67		14.00		28.33		25.25	20.00		22.67		21.50
Total	567.33	552.33	590.00	596.00	831.00	891.00	863.25	731.75	691.00	696.33	660.17	659.00
Average	18.30	19.05	19.03	19.87	26.81	29.70	27.85	23.60	23.03	22.46	22.01	21.26
Min	12.50	16.00	14.00	10.00	14.00	21.50	17.00	18.50	19.00	20.00	18.50	18.00
Max	26.33	22.00	23.00	23.50	48.00	42.00	41.00	28.67	27.00	27.00	25.00	26.00

**Yearly Total** 8,329.17  
**Yearly Average** 22.75  
**Yearly Min** 10.00  
**Yearly Max** 48.00

**Maximum flow** 108.0 m<sup>3</sup>/d



85 Lappan's Ln  
 P.O. Box 790  
 Kingston, Ontario  
 K7L 4X7  
 (613) 546-1181

Canal Well Supply - Daily Total - **Treated Water Flows** 2020  
 m<sup>3</sup>

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	26.33	17.67	19.67	16.50	23.00	21.50	23.00	23.00	19.00	22.50	20.67	20.50
2	26.33	17.67	15.00	16.50	23.00	21.50	23.00	23.00	21.00	22.67	19.50	17.50
3	19.00	15.00	15.00	18.67	23.00	27.00	37.00	23.00	21.00	22.67	19.50	17.50
4	19.00	15.00	14.00	18.67	19.50	27.00	37.00	22.00	20.00	22.67	18.00	22.00
5	19.00	20.00	14.00	18.67	19.50	25.33	37.00	18.50	20.00	18.50	18.00	22.00
6	17.50	20.00	17.00	20.50	20.20	25.33	24.00	18.50	20.00	18.50	23.00	22.00
7	17.50	16.67	17.00	20.50	20.20	25.33	24.00	25.67	23.50	19.50	23.00	21.00
8	15.00	16.67	17.00	12.00	20.20	29.50	34.00	25.67	23.50	19.50	23.00	21.00
9	15.00	16.67	16.00	19.33	20.20	29.50	34.00	25.67	19.00	23.75	17.00	16.50
10	16.33	17.00	16.00	19.33	20.20	25.00	25.33	22.00	19.00	23.75	17.00	16.50
11	16.33	17.00	16.50	19.33	19.50	25.00	25.33	22.00	22.33	23.75	18.00	21.00
12	16.33	17.33	16.50	16.50	19.50	27.33	25.33	24.00	22.33	23.75	18.00	21.00
13	14.00	17.33	19.00	16.50	18.00	27.33	19.50	24.00	22.33	16.00	22.33	21.00
14	14.00	17.33	19.00	17.00	18.00	27.33	19.50	27.67	22.50	24.00	22.33	19.00
15	19.00	17.33	19.00	19.00	22.25	25.50	20.00	27.67	22.50	20.00	22.33	19.00
16	19.00	17.33	17.50	19.00	22.25	25.50	20.00	27.67	18.00	22.00	20.50	19.50
17	18.33	17.33	17.50	17.67	22.25	26.50	23.67	19.50	18.00	22.00	20.50	19.50
18	18.33	15.00	18.00	17.67	22.25	26.50	23.67	19.50	23.67	22.00	24.00	21.67
19	18.33	15.00	18.00	17.67	35.00	37.33	23.67	22.50	23.67	19.50	24.00	21.67
20	14.50	15.00	17.67	18.00	31.00	37.33	26.00	22.50	23.67	19.50	22.67	21.67
21	14.50	17.67	17.67	18.00	31.00	37.33	18.00	21.33	20.00	20.80	22.67	21.00
22	15.50	17.67	17.67	16.00	27.00	23.50	27.00	21.33	20.00	20.80	22.67	21.00
23	15.50	17.67	17.00	16.00	27.00	23.50	27.00	21.33	21.00	20.80	19.50	16.00
24	17.67	16.00	17.00	23.33	27.00	29.00	29.33	20.50	21.00	20.80	19.50	23.50
25	17.67	16.00	17.50	23.33	28.50	29.00	29.33	20.50	24.67	20.80	19.00	23.50
26	17.67	14.50	17.50	23.33	28.50	25.00	29.33	21.50	24.67	20.00	19.00	18.67
27	17.00	14.50	17.67	20.00	35.00	25.00	25.00	21.50	24.67	20.00	22.33	18.67
28	17.00	19.67	17.67	20.00	20.00	25.00	25.00	22.33	19.50	20.50	22.33	18.67
29	14.50	19.67	17.67	21.00	28.00	27.00	21.00	22.33	19.50	20.50	22.33	20.50
30	14.50		19.00	21.00	28.00	23.00	21.00	22.33	22.50	20.67	20.50	20.50
31	17.67		19.00		28.00		23.00	19.00		20.67		21.25
Total	538.33	491.67	534.67	561.00	747.00	810.00	800.00	698.00	642.50	652.83	623.17	624.75
Average	17.37	16.95	17.25	18.70	24.10	27.00	25.81	22.52	21.42	21.06	20.77	20.15
Min	14.00	14.50	14.00	12.00	18.00	21.50	18.00	18.50	18.00	16.00	17.00	16.00
Max	26.33	20.00	19.67	23.33	35.00	37.33	37.00	27.67	24.67	24.00	24.00	23.50
					<b>Yearly Total</b>		<b>7,723.92</b>					
					<b>Yearly Average</b>		<b>21.09</b>					
					<b>Yearly Min</b>		<b>12.00</b>					
					<b>Yearly Max</b>		<b>37.33</b>					
	<b>CoA amount</b>	<b>108.0 m<sup>3</sup>/d</b>										



**RAVENSVIEW  
WASTE WATER TREATMENT PLANT**



**2020 ANNUAL REPORT**





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## REPORT CHECK LIST

Annual report submitted under Condition 10 of the Environmental Compliance Approval (ECA) number 2200-A82L2B.

Condition 10- The Owner shall prepare, and submit to the District Manager, a performance report, on an annual basis, within ninety (90) days following the end of the period being reported upon.

Condition 10- Each annual report shall contain at least the following information:

- Summary and interpretation of all monitoring data and a comparison to the effluent limits outlined in Condition 7, including an overview of the success and adequacy of the works.
- Description of any operating problems encountered, and corrective actions taken.
- Summary of any effluent quality assurance or control measures undertaken in the reporting period.
- Summary of the calibration and maintenance carried out on all effluent monitoring equipment.
- Description of efforts made, and results achieved in meeting the Effluent Objectives of Condition 7.
- Tabulation of the volume of sludge generated in the reporting period, an outline of anticipated volumes to be generated in the next reporting period and a summary of the locations to where the sludge was disposed.
- Summary of any complaints received during the reporting period and any steps taken to address the complaints.
- Summary of all by-pass, spill or abnormal discharge events.
- Any other information the District Manager requires from time to time.



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## EXECUTIVE SUMMARY

The Ravensview Wastewater Treatment Plant (WWTP) operates under a Ministry of the Environment, Conservation and Parks, ECA number 2200-A82L2B. For the reporting year 2020 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.

Average flow through the plant was 59,435 m<sup>3</sup>/day.

The facility had three secondary bypass events in the 2020 reporting year. All bypass details are listed in Table 7, the Bypass Summary section of this report.

Since the facility's commissioning in 2009, staff have been able to enhance the operation and to make this WWTP a highly effective treatment facility. The Ravensview WWTP continues to generate interest from international groups. We also provide valuable research opportunities and hands-on experience to graduate students from local educational institutions such as Queen's University.

Operational staff continually improve the operation of the Ravensview WWTP taking full advantage of its state-of-the-art technology to protect the environment and maintain the quality of service our residents have come to know.

## Plant Overview

The following is a process overview and description of the treatment steps taken at the Ravensview Wastewater Treatment Plant.



### 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. A newly constructed septage receiving station is now online. The septage receiving station, which is located at the influent headworks gives approved septic truck haulers a place to discharge the contents of their tanks. The septage receiving station monitors the quantity, origin and contents being unloaded and provides some pretreatment before the contents enter the WWTP.

### Screening

The first step in the treatment process is screening of the raw wastewater. 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.



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## 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 corkscrew like system pushes the settled grit into a hopper at the end of the tank. From there 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.

## Primary Clarifiers

After removing the floatables and grit, the only material left in the wastewater is organic material and dissolved contaminants. In the primary clarifier tanks, the wastewater flows very slowly from the 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 the one end of the tank where it is pumped across to the digesters for further processing. At the end of the primary clarifiers, the now cleaner wastewater, termed 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 as well. Any floatable materials that may have slipped through the bars in the screening process will be ground up before entering the digester.

## Biologically Aerated Filters

The primary effluent flows to a pumping facility which lifts the wastewater up to the channel running along the centre of the Biologically 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. As it does, the water is aerated to encourage growth of numerous microorganisms which consume carbon dissolved in the water, 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. The clean water is then disinfected with chlorine to kill any pathogenic microorganisms that may pass through the filters. Like other filters, these are backwashed periodically to remove excess biomass growth and filtered particles, to restore the filters' ability to process wastewater efficiently.

## 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 to de-chlorinate it, and to ensure no chlorine remains in the water entering the receiving stream.



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### **Discharge to the St. Lawrence River**

After the wastewater has been disinfected and de-chlorinated, it flows by gravity out a 1050 mm diameter outfall sewer with fourteen 250 mm elbow diffusers, approximately 240 m offshore, and into the St. Lawrence River.

### **Anaerobic Digesters**

Solids from the raw sewage entering the plant and from the BAF backwash water are settled in the clarifiers, then pumped into the digesters. The digesters are sealed, and anaerobic (without oxygen). Inside, the mixture is heated to allow microorganisms to grow and consume carbon, and to produce methane gas and carbon dioxide. One of the digesters is heated to 55 degrees Celsius (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 which are heated to 36 degrees Celsius (mesophilic), where they remain for 15 days before being stored in the secondary digester and ultimately dewatered. The digestion process reduces the amount of carbon, stabilizing the material into what is called bio-solids, which is applied to approved farm fields, and used as soil nutrients and conditioning material.

### **Power Building**

The Power Building houses two 575 kW electric back-up generators that are designed to run the wastewater treatment plant in the event of a power outage. These units are powered by 12-cylinder, low emission natural gas engines chosen specifically for this plant to avoid the need to use diesel fuel. These units will start automatically in the event of a power failure. A third unit within the power building is a combined heat and power generation system, or 'Co-gen' unit. 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. The gas produced on-site helps offset the power purchased from the grid and reduces the amount of gas required to heat the digesters.



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## Dewatering

Liquid bio-solids which is about 2% solid and 98% water, is funneled from the digester holding tank into the centrifuge where a polymer is added to help the solids stick together. The centrifuge spins at a high speed forcing the solids to the outer drum and out of the liquid, where solids are pushed along and out of the centrifuge. The solids content (cake) is now about 30% and the cake material is augered to a hole in the floor where it falls into a hopper. When enough material is in the hopper, a piston pump pushes the solid cake (bio-solids) to the bio-solids storage building. Alternately, the cake materials can be loaded directly into a waiting dump truck in a separate loading bay. The remaining liquid contains many nutrients and some microorganisms. After the centrifuge processes this liquid, called centrate, is returned to the plant for treatment.

## Bio-solids Storage

One of the three main beneficial products produced at Ravensview is a nutrient rich bio-solid material. The dry product resulting from the treatment processes may be stored on site for up to 200 days in large concrete bunkers. When approved farmland is available, the material is loaded into trucks within the bio-solids storage building, in an odour controlled room.

## Land Application

The stored bio-solids are held onsite until they can be used for agricultural land application. The bio-solids are transported and applied on fields that have been tested and approved by the Ministry of Environment, Conservation and Parks to meet standards with respect to distance from homes, wells, water bodies and sensitive lands. After application, the bio-solids are ploughed into the field to prevent off-site odours or wash-off. By carefully regulating the application only to licensed fields, the public is protected from contact with this material that may still contain some micro-organisms.

## Administration/ Lab Building

The various devices and processes used at the Ravensview WWTP are connected to an onsite SCADA system which can be used to monitor and adjust plant processes. This system is located within the administration building. The building also contains a fully operating laboratory for onsite testing of various wastewater parameters as well as offices and lunchroom facilities.



## PLANT PERFORMANCE

The enclosed performance assessment summarizes and confirms the facility's compliance. Refer to appendix A for detailed tables and graphs for various parameter results.

All effluent quality and quantity parameters outlined in condition 7 of ECA number 2200-A82L2B were complied with during the reporting period of 2020.

The following tables summarize the results obtained through monitoring of plant performance in accordance with condition 7 of the ECA number 2200- A82L2B.

**Table 1: Effluent Parameters**

Effluent Parameter	Objective (mg/l)	2020 Results (avg)
CBOD <sub>5</sub>	15.0	2 mg/l
Total suspended solids (TSS)	15.0	3.8 mg/l
Total Phosphorus	0.8	0.40 mg/l
Total Ammonia Nitrogen (October 01 to May 31) (June 01 to 30 and September 01 to 30) (July 01 to August 31)	12.0 7.0 5.0	0.94 mg/l 0.65 mg/l 0.44 mg/l
Total Chlorine Residual	Non-detectable	0.01 mg/l
E. Coli (Monthly Geometric Mean Density)	100 counts/ 100 ml	15 counts/ 100 ml

**Table 2: Effluent Limits**

Effluent Parameter	Concentration Limit (mg/l)	Loading Limit from effluent (kg/d)	2020 annual average
CBOD <sub>5</sub>	25.0	2,375	131 (kg/d)
Suspended solids (TSS)	25.0	2,375	286.5 (kg/d)
Total Phosphorus	1.0	95	29.0 (kg/d)
pH	Maintained between 6.0 and 9.5		7.55





Effluent Parameter	Concentration Limit (mg/l)	Loading Limit from effluent (kg/d)	2020 annual average
Acute lethality to rainbow trout			pass

**Table 3: Monthly Effluent Parameters**

Month	CBOD5 max concen/max loading (mg/L_kg/day)	TSS max concen/max loading (mg/L_kg/day)	TP max concen/max loading (mg/L_kg/day)	E. coli (Monthly geometric mean density)
January	2mg/L-120kg/day	10mg/L 700kg/day	0.48mg/l 56kg/day	17
February	5mg/L-500kg/day	10mg/L 1000kg/day	0.79mg/l 83kg/day	8
March	4mg/L-300kg/day	8mg/L 900kg/day	0.81mg/l 70kg/day	7
April	3mg/L-150kg/day	4mg/L 300kg/day	0.80mg/l 57kg/day	4
May	3mg/L-120kg/day	6mg/L 400kg/day	0..76mg/l 87kg/day	4
June	3mg/L-100kg/day	5mg/L 300kg/day	0.82mg/l 64kg/day	8
July	3mg/L-120kg/day	7mg/L 400kg/day	0..82mg/l 46kg/day	8
August	7mg/L-400kg/day	23mg/L 1000kg/day	1.02mg/l 90kg/day	32
September	14mg/L-510kg/day	16mg/L 740kg/day	1.16mg/l 58kg/day	24
October	3mg/L-100kg/day	32mg/L 1400kg/day	0.71mg/l 41kg/day	5
November	6mg/L-400kg/day	15mg/L 620kg/day	1.14mg/l 51kg/day	4
December	3mg/L -110kg/day	11mg/L 710kg/day	0.38mg/l 27kg/day	4

**Table 4: Annual Plant Flows**

<b>Parameter</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>
Avg. m <sup>3</sup> /day	60,916	53,076	59,640	86,200	69,005	77,265	59,435
Max. m <sup>3</sup> /day	185,620	136,899	179,987	169,266	181,067	160,459	141,016
Design. m <sup>3</sup> /day	95,000	95,000	95,000	95,000	95,000	95,000	95,000
Design Peak m <sup>3</sup> /day	193,000	193,000	193,000	193,000	193,000	193,000	193,000
% (daily/design)	69	56	63	91	73	81	63
% (peak/design)	96	71	93	88	94	83	73

**Table 5: Effluent Parameters**

Parameter	2014	2015	2016	2017	2018	2019	2020	LIMITS
CBOD <sub>5</sub>	2.2	1.5	1.78	1.17	2	2	3	<b>25 mg/l</b>
Suspended Solids	4.3	4.4	6.0	6.1	5	3.8	4.6	<b>25 mg/l</b>
Total	0.42	0.40	0.47	0.40	0.43	0.40	.59	<b>1.0 mg/l</b>
Total Chlorine	<0.0	<0.0	<0.0	<0.0	<0.0	<0.0	0.00	<b>&lt; 0.04</b>
Acute Lethality	All Pass	All Pass	All Pass	All Pass	All Pass	All Pass	All Pass	<b>Pass</b>

## MAINTENANCE

In 2020 we continued with our preventative maintenance program of vibration testing, oil analysis and electrical surge protection.

The following bullet points highlight other major projects completed this year.

- Sludge pump rebuild.
- Odour control system improvements.
- Routine vibration monitoring.
- Digester transfer pumps rebuild.

## CAPITAL WORKS

The major highlights for capital works in 2020 at the Ravensview WWTP and associated sewage collection system were:

- Electrical bus duct replacement.
- Cogen cooling system upgrade.
- Grit system screw conveyor replacement.
- Construction of the new Riverview Way Sewage Pumping Station.
- Boiler system upgrades.
- Sludge cake pump gear box replacement.

## Operations

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 is still implementing a public education program to make



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customers more aware of what materials should not be flushed down the sewers. This program has included radio and newspaper campaigns, social media campaigns such as Twitter and Facebook, bill stuffers, information on back of parking tickets, and bus information signs. This has been an ongoing campaign for the past three years with some positive results.

## BIO-SOLIDS MANAGEMENT

The dewatering facility is the primary method of solids handling at the Ravensview WWTP. The secondary digested sludge is dewatered through a centrifuge and then stockpiled onsite in the bio-solids storage building.

Ravensview WWTP processed a volume of 58,273 m<sup>3</sup> of liquid sludge through the centrifuge, and approximately 5,607 m<sup>3</sup> of sludge cake was stored on site until it was applied to land on licensed agricultural fields. Land application is completed by Terra Pure Environmental. They applied 4,105 mt on fields.

It is too hard to predict exactly where and when the bio-solids will be spread in 2021. Crops and weather will be the major variables that will dictate the course of the 2021 spreading season. Below are the active C of A's and addresses for the City of Kingston in which spreading can take place.

**Table 6: Biosolids Recipients in 2020**

<u>C Of A and NASM Plan</u>	<u>Address</u>	<u>Expiry Date</u>
22853	Huffam Rd.	31/12/2021
22855	Lake Rd.	31/12/2021
22901	County Rd.8	31/12/2021
23007	County Rd. 4	31/12/2021
23047	Palace Rd.	31/12/2021
23048	Multiple farms	31/12/2021
23119	Hamilton Rd.	31/12/2021
23425	Parry/Chambers Rd.	31/12/2022
23525	County Rd. 8	31/12/2022
23641	Hamilton Rd.	31/12/2022
23950	County Rd. 8	31/12/2023
24003	Hamilton Rd.	31/12/2023
24091	Multiple farms	31/12/2023
24326	Greater Napanee	31/12/2024
24327	Greater Napanee	31/12/2024

## EQUIPMENT CALIBRATIONS

All the facility flow meters are calibrated annually by third party contractors. As a result of this proactive approach, the facility saw limited downtime of major equipment and saw very few mechanical or electrical failures this year. Calibration records are available upon request.

## COMPLAINTS

There was one odour complaint related to Ravensview in the 2020 reporting year (March 25/20). Operations were modified to alleviate odours from these activities.

## BYPASS SUMMARY

Table 7 summarizes the locations, volumes and durations of bypass events for the reporting year 2020. Table 8 summarizes the test results from samples taken during the 2020 bypass events at King- George CSO as well as test results for secondary bypasses at Ravensview WWTP.

**Table 7: Bypass Summaries**

<b>Date</b>	<b>Location</b>	<b>Start Time</b>	<b>End Time</b>	<b>Volume (m<sup>3</sup>)</b>	<b>Reason</b>	<b>Precip (mm)</b>
01/11/2020	Sherwood Dr.	18:36	21:10	19.4	Rain/rapid snow melt	38
01/11/2020	535 Rideau Belle Park	19:44	17:53	12928	Rain/rapid snow melt	38
01/11/2020	Earl St.	14:57	4:23	161	Rain/rapid snow melt	38
01/11/2020	West St.	20:21	19:56	4332	Rain/rapid snow melt	38
01/11/2020	King-George CSO	18:58	23:20	14013	Rain/rapid snow melt	38
01/11/2020	King-Collingwood CSO	18:37	08:00	15330	Rain/rapid snow melt	38
03/4/2020	Ravensview WWTP (Secondary Bypass)	00:22	00:50	1547	Rain	9.5



Date	Location	Start Time	End Time	Volume (m <sup>3</sup> )	Reason	Precip (mm)
03/5/2020	Ravensview WWTP (Secondary Bypass)	14:50	15:15	347	Rain	0.8
04/13/2020	535 Rideau Belle Park	20:33	03:41	28	Rain	29
04/13/2020	Earl St.	12:58	15:50	108	Rain	29
04/13/2020	West St.	21:14	04:18	72	Rain	29
04/13/2020	King- George CSO	18:54	08:38	3043	Rain	29
04/13/2020	King-George CSO	15:54	04:21	6.25	Rain	29
04/30/2020	Helen St.	23:51	01:23	12	Rain	47
04/30/2020	Earl St.	17:02	00:12	311	Rain	47
04/30/2020	Lower Union	23:24	23:44	35	Rain	47
04/30/2020	King-George CSO	22:51	17:47	11913	Rain	47





Date	Location	Start Time	End Time	Volume (m <sup>3</sup> )	Reason	Precip (mm)
04/30/2020	King-Collingwood CSO	23:30	00:53	1454	Rain	47
05/01/2020	West St.	00:19	01:53	73	Rain	47
05/01/2020	535 Rideau Belle Park	00:35	09:20	3639	Rain	47
05/01/2020	West St.	01:48	04:58	15	Rain	47
05/25/2020	535 Rideau Belle Park	04:50	04:57	27	Rain	16.7
05/25/2020	Earl St.	04:31	05:49	168	Rain	16.7
05/25/2020	Lower Union St.	04:43	05:40	43	Rain	16.7
06/03/2020	535 Rideau Belle Park	21:13	21:21	76	Rain	2.2
06/03/2020	Earl St.	21:10	21:22	123	Rain	2.2
06/03/2020	Lower Union	21:14	21:18	6	Rain	2.2
06/06/2020	Union St.	17:41	17:45	0.019	Rain	12



Date	Location	Start Time	End Time	Volume (m <sup>3</sup> )	Reason	Precip (mm)
06/06/2020	535 Rideau Belle Park	17:43	18:05	235	Rain	12
06/06/2020	Raglan Rd.	17:42	17:57	23	Rain	12
06/06/2020	Clarence St.	17:52	18:05	89	Rain	12
06/06/2020	Earl St.	05:40	18:10	296	Rain	12
06/06/2020	Lower Union St.	17:42	18:04	51	Rain	12
06/27/2020	535 Rideau St.	19:43	19:49	21	Rain	37
06/27/2020	Earl St.	19:59	20:22	44	Rain	37
07/11/2020	Quebec St.	22:48	22:56	0.1	N/A	41
07/11/2020	Earl St.	08:53	09:09	30	N/A	41
07/13/2020	Sherwood St.	03:08	03:08	1.7	Rain	26
07/13/2020	Union St.	03:30	03:30	1	Rain	26
07/13/2020	Clarence St.	03:26	03:47	215	Rain	26
07/13/2020	William St.	03:19	03:32	17.5	Rain	26
07/13/2020	Earl St.	03:12	03:48	479	Rain	26
07/13/2020	Gore St.	03:21	03:32	32	Rain	26
07/13/2020	Lower Union	03:17	03:39	165	Rain	26



Date	Location	Start Time	End Time	Volume (m <sup>3</sup> )	Reason	Precip (mm)
07/13/2020	West St.	03:24	03:33	36	Rain	26
07/13/2020	King-George CSO	03:52	04:07	28	Rain	26
07/13/2020	Earl St.	11:34	11:59	32	Rain	26
07/13/2020	King-George CSO	11:43	12:22	245	Rain	26
08/02/2020	Earl St.	10:51	10:54	0.001	N/A	21.2
08/02/2020	Lower Union St.	10:39	10:50	29.5	N/A	21.2
08/16/2020	Earl St.	22:24	22:35	57	N/A	10
08/18/2020	Ravensview WWTP (Secondary Bypass)	11:30	04:45	157	Rain	2
08/27/2020	535 Rideau St.	10:12	10:32	212	Rain	41.7
08/27/2020	Clarence St.	10:17	10:35	161	Rain	41.7
08/27/2020	William St.	10:15	10:16	0.001	Rain	41.7
08/27/2020	Earl St.	09:40	11:10	437	Rain	41.7



Date	Location	Start Time	End Time	Volume (m <sup>3</sup> )	Reason	Precip (mm)
08/27/2020	Gore St.	10:12	10:17	11.8	Rain	41.7
08/27/2020	Lower Union W	09:43	10:59	171	Rain	41.7
08/27/2020	West St.	10:11	10:28	104	Rain	41.7
08/27/2020 08/29/2020	Earl St.	09:40	03:29	511	Heavy Rain	57
08/27/2020 08/29/2020	Lower Union	09:43	03:19	179.8	Heavy Rain	57
11/15/2020	Lower Union	17:38	17:48	15	Rain	8.4

**Table 8: Bypass Sampling Results**

Parameter	Units	Ravensview WWTP (Secondary Bypass) Annual Avg.	King-George CSO Annual Avg.
Total Coliform	Cfu/100m	N/A	1900000
E coli	Cfu/100m	25000	273636
HPC	Cfu/mL	N/A	273000
CBOD <sub>5</sub>	Mg/L	20.5	12
TSS	Mg/L	27	50.5
TP	Mg/L	1.0	0.64
TKN	Mg/L	7.5	5.4

**Bypass Results Interpretations**

All bypass discharges have a high bacteria count due to the lack of disinfection. CBOD<sub>5</sub>, TP and TKN results are much lower than typical WWTP raw sewage influent due to the dilution attributed to rainwater during these events. Best efforts are made to capture the debris contained in these discharges to the lake. After each bypass event, shoreline inspections near discharge points are done to monitor any debris that may come ashore. Clean up is done if debris is found.

**APPENDIX A – MONITORED PARAMETERS RESULTS AND GRAPHS**

For further information about this report or any questions regarding accessibility contact Troy Dickerson at [tdickerson@utilitieskingston.com](mailto:tdickerson@utilitieskingston.com) , or call 613-546-1181 Ext 2190.



# RAVENSVIEW Wastewater Treatment Plant

## 2020 ANNUAL REPORT

### Monthly data

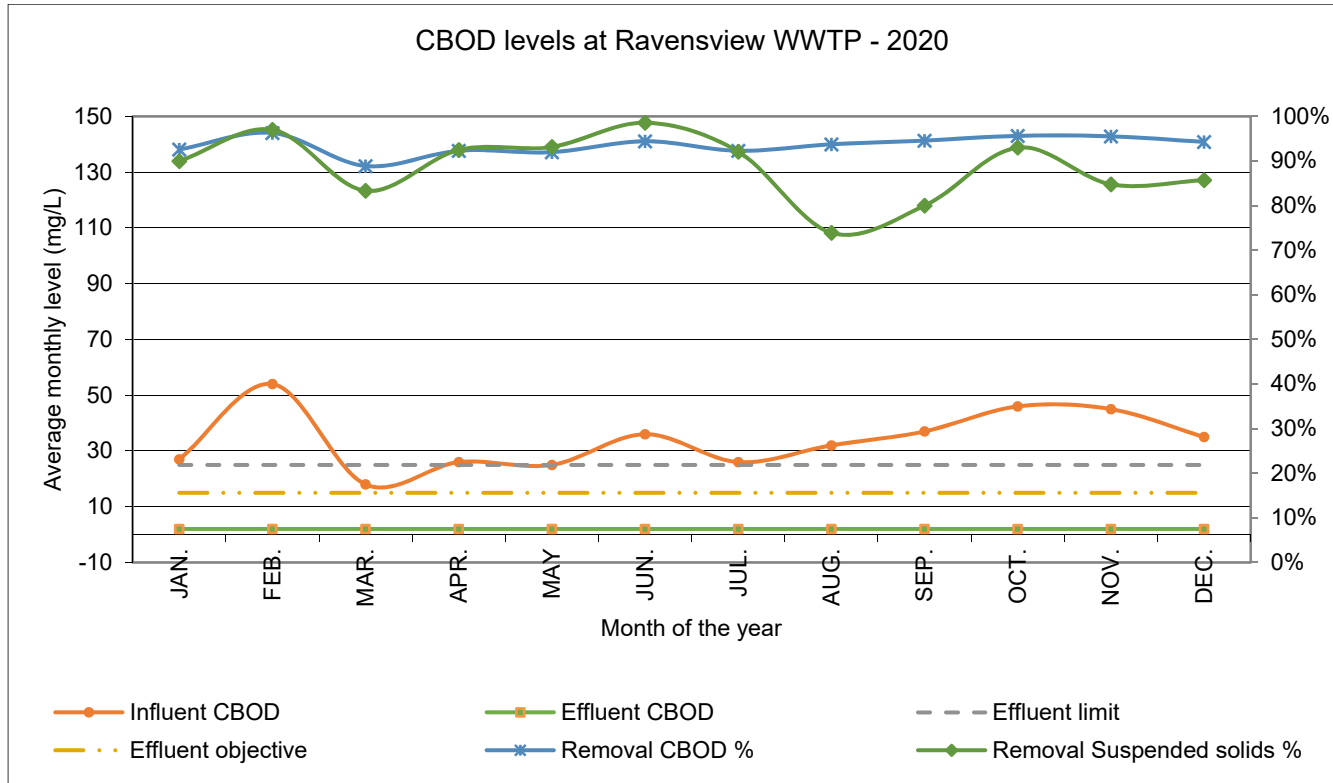
Month	Raw sewage	Final Effluent	Removal	Raw sewage	Final Effluent	Removal
	CBOD mg/L	CBOD mg/L	CBOD %	Suspended solids mg/L	Suspended solids mg/L	Suspended solids %
JAN.	27.0	2.0	93%	40.0	4.0	90%
FEB.	54.0	2.0	96%	134.0	4.0	97%
MAR.	18.0	2.0	89%	30.0	5.0	83%
APR.	26.0	2.0	92%	40.0	3.0	93%
MAY	25.0	2.0	92%	44.0	3.0	93%
JUN.	36.0	2.0	94%	213.0	3.0	99%
JUL.	26.0	2.0	92%	38.0	3.0	92%
AUG.	32.0	2.0	94%	23.0	6.0	74%
SEP.	37.0	2.0	95%	40.0	8.0	80%
OCT.	46.0	2.0	96%	129.0	9.0	93%
NOV.	45.0	2.0	96%	46.0	7.0	85%
DEC.	35.0	2.0	94%	28.0	4.0	86%

	Raw sewage	Final Effluent	Removal	Raw sewage	Final Effluent	Removal
Average	33.9	2.0	94%	67.1	4.9	93%
Objective		15.0			15.0	
Limit		25.0			25.0	



# RAVENSVIEW Wastewater Treatment Plant

## 2020 ANNUAL REPORT





# RAVENSVIEW Wastewater Treatment Plant

## 2020 ANNUAL REPORT

### Monthly data

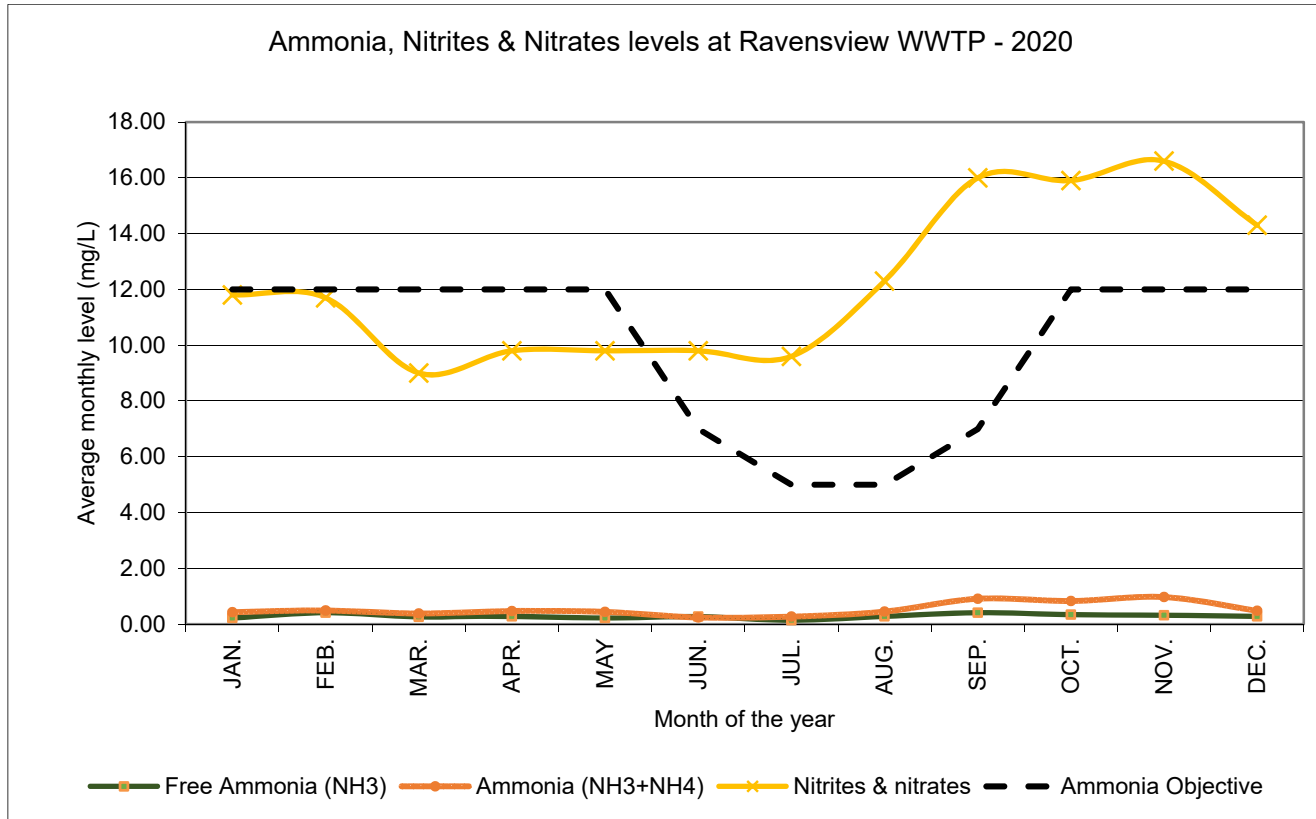
Month	Raw sewage	Final Effluent	Removal	Raw sewage	Final Effluent	Removal
	CBOD mg/L	CBOD mg/L	CBOD %	Suspended solids mg/L	Suspended solids mg/L	Suspended solids %
JAN.	27.0	2.0	93%	40.0	4.0	90%
FEB.	54.0	2.0	96%	134.0	4.0	97%
MAR.	18.0	2.0	89%	30.0	5.0	83%
APR.	26.0	2.0	92%	40.0	3.0	93%
MAY	25.0	2.0	92%	44.0	3.0	93%
JUN.	36.0	2.0	94%	213.0	3.0	99%
JUL.	26.0	2.0	92%	38.0	3.0	92%
AUG.	32.0	2.0	94%	23.0	6.0	74%
SEP.	37.0	2.0	95%	40.0	8.0	80%
OCT.	46.0	2.0	96%	129.0	9.0	93%
NOV.	45.0	2.0	96%	46.0	7.0	85%
DEC.	35.0	2.0	94%	28.0	4.0	86%

	Raw sewage	Final Effluent	Removal	Raw sewage	Final Effluent	Removal
Average	33.9	2.0	94%	67.1	4.9	93%
Objective		15.0			15.0	
Limit		25.0			25.0	





# RAVENSVIEW Wastewater Treatment Plant 2020 ANNUAL REPORT





## RAVENSVIEW Wastewater Treatment Plant

## 2020 ANNUAL REPORT

## Monthly data

## Ferric Chloride

Month	Unit	Dosage Litres / day	Dosage Kg / day	Dosage Litres / month	Dosage Kg / month	Dosage mg/L
JAN.		1,185	184	36,740	5,704	3.38
FEB.		1,261	196	35,310	5,482	3.41
MAR.		1,270	199	39,380	6,114	2.99
APR.		1,276	198	38,280	5,943	2.44
MAY		1,473	229	45,650	7,087	2.10
JUN.		1,423	221	42,680	6,626	2.03
JUL.		1,441	224	44,660	6,934	2.37
AUG.		1,331	207	41,250	6,404	2.67
SEP.		1,467	228	44,000	6,831	3.61
OCT.		1,863	289	57,750	8,966	4.63
NOV.		1,401	217	42,020	6,524	3.33
DEC.		1,352	210	41,910	6,507	3.47
Average Objective Limit		1,395	217	42,469	6,593.50	3.04



RAVENSVIEW Wastewater Treatment Plant

2020 ANNUAL REPORT

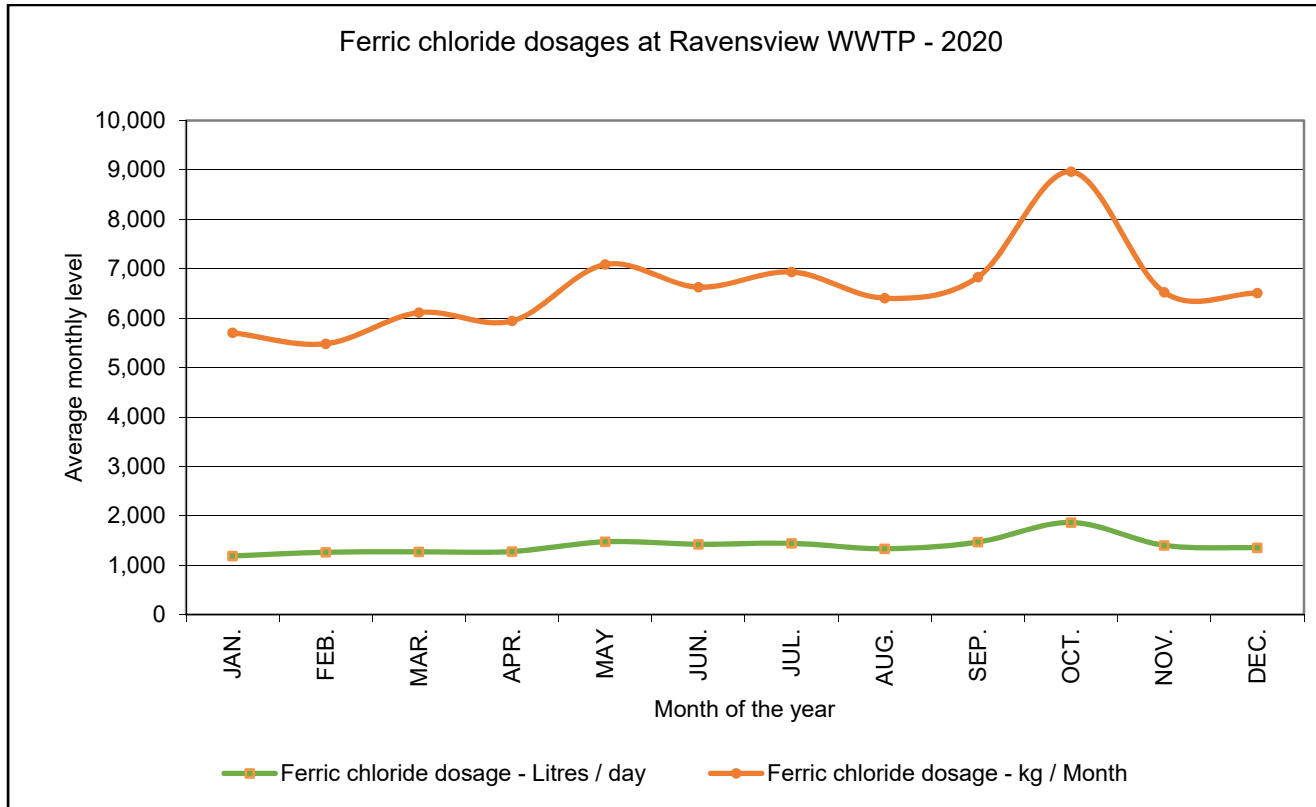
Monthly data

**Bacterial Results**

Month	Final Effluent			Final Effluent	Final Effluent	
	Unit	E. Coli. counts / 100mL	E-Coli Objective counts / 100mL	E-Coli Limit counts / 100mL	Total Coliforms (second axis) counts / 100mL	Fecal Streptococci counts / 100mL
JAN.		17	100	200	314	69
FEB.		8	100	200	346	119
MAR.		7	100	200	72	40
APR.		4	100	200	135	76
MAY		4	100	200	34	64
JUN.		8	100	200	191	17
JUL.		8	100	200	215	114
AUG.		32	100	200	1,296	92
SEP.		24	100	200	346	50
OCT.		5	100	200	223	42
NOV.		4	100	200	111	29
DEC.		4	100	200	139	53
Average		10.42			285.17	63.75
Objective		100				
Limit		200				

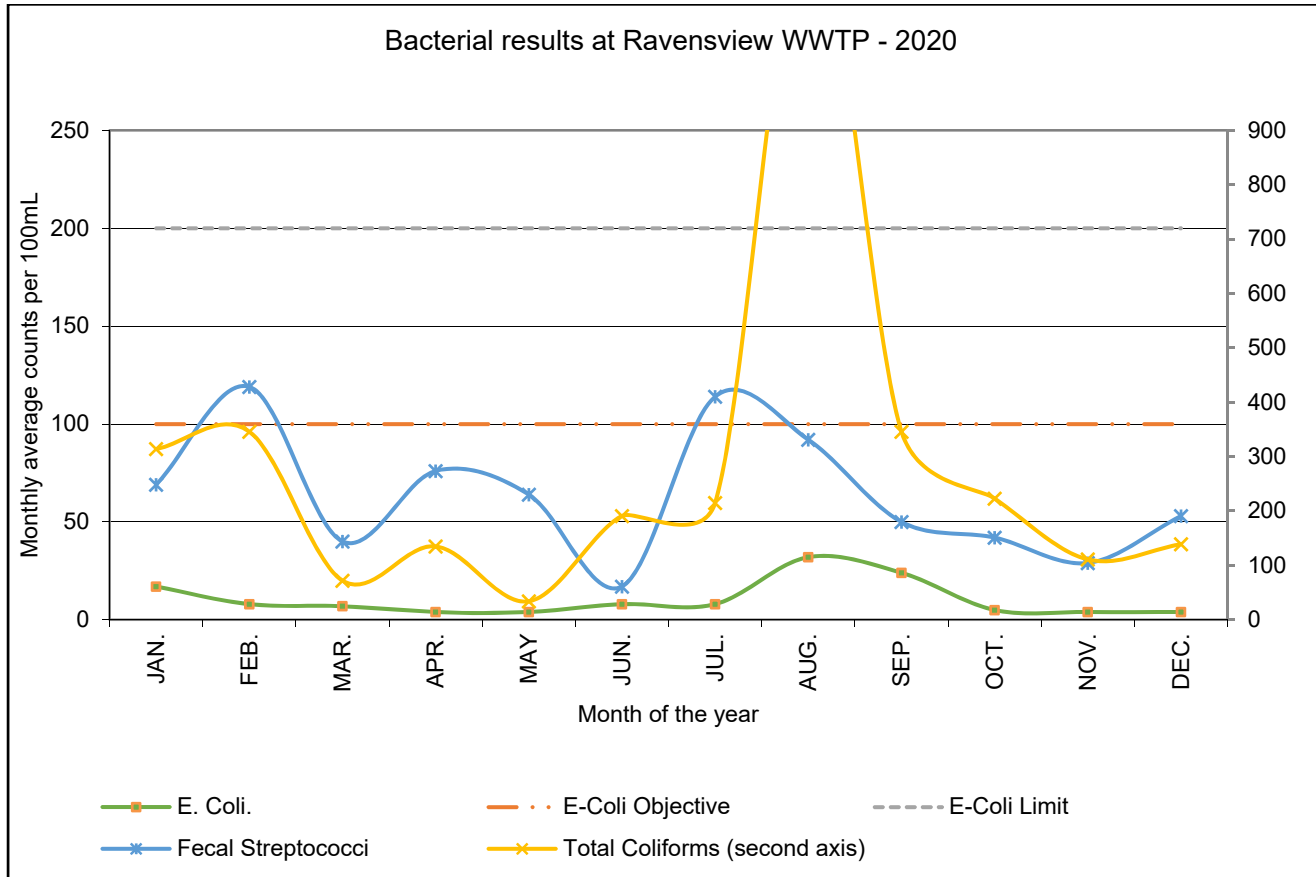


# RAVENSVIEW Wastewater Treatment Plant 2020 ANNUAL REPORT





# RAVENSVIEW Wastewater Treatment Plant 2020 ANNUAL REPORT





RAVENSVIEW Wastewater Treatment Plant

2020 ANNUAL REPORT

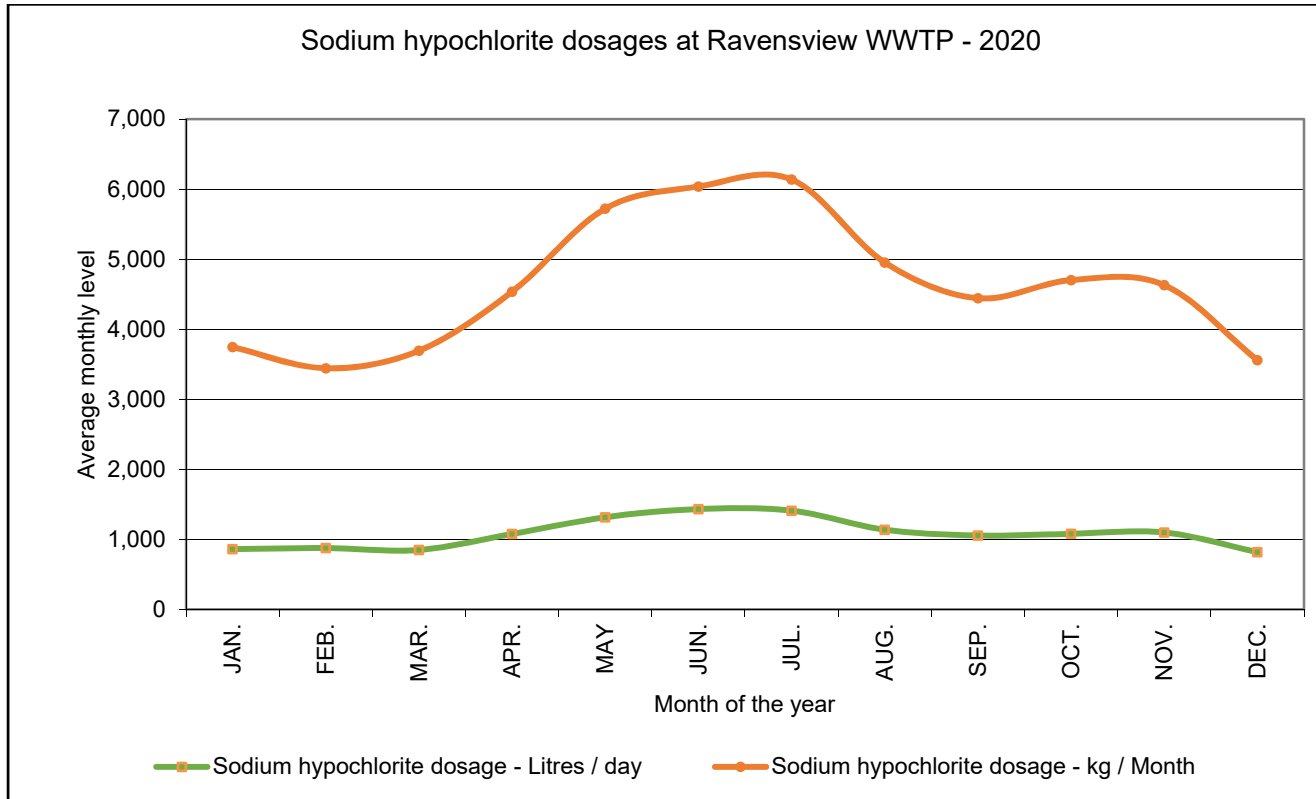
Monthly data

**Sodium Hypochlorite**

Month	Unit	Dosage Litres / day	Dosage Kg / day	Dosage Litres / month	Dosage Kg / month	Dosage mg/L	Residual mg/L
JAN.		860	121	26,671	3,745	2.24	0.94
FEB.		876	123	24,523	3,443	2.16	0.90
MAR.		849	119	26,306	3,693	1.94	0.90
APR.		1,077	151	32,310	4,536	1.92	0.77
MAY		1,315	185	40,759	5,722	1.71	0.60
JUN.		1,433	201	42,997	6,037	1.85	0.63
JUL.		1,410	198	43,722	6,138	2.10	0.70
AUG.		1,138	160	35,275	4,953	2.05	0.61
SEP.		1,055	148	31,642	4,443	2.31	0.62
OCT.		1,080	152	33,494	4,702	2.40	0.79
NOV.		1,099	154	32,976	4,630	2.36	0.89
DEC.		818	115	25,344	3,558	1.89	0.76
Average Objective Limit		1,084	152.3	33,002	4,633	2.08	0.76



# RAVENSVIEW Wastewater Treatment Plant 2020 ANNUAL REPORT





## RAVENSVIEW Wastewater Treatment Plant

## 2020 ANNUAL REPORT

## Monthly data

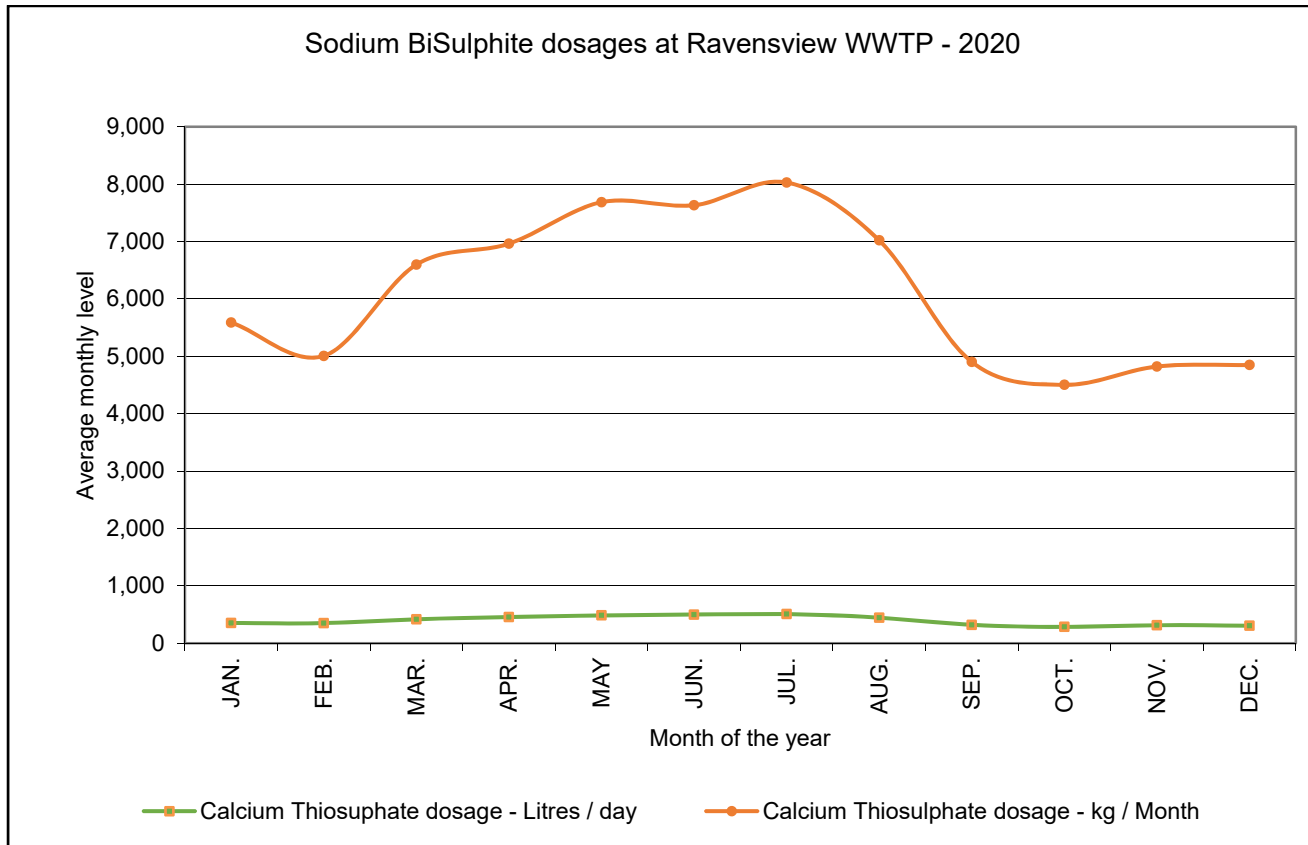
**Sodium BiSulphite**

Month	Dosage	Dosage	Dosage	Dosage	Dosage	Residual	Compliance
Unit	Litres / day	Kg / day	Litres / month	Kg / month	mg / L	mg / L	Yes / No
JAN.	354	180	10,972	5,590	3.37	0.0	yes
FEB.	351	179	9,828	5,007	3.19	0.0	yes
MAR.	418	213	12,948	6,597	3.31	0.0	yes
APR.	456	232	13,666	6,963	2.93	0.0	yes
MAY	486	248	15,080	7,684	2.31	0.0	yes
JUN.	499	254	14,976	7,631	2.34	0.0	yes
JUL.	508	259	15,756	8,028	2.74	0.0	yes
AUG.	445	226	13,780	7,021	2.93	0.0	yes
SEP.	321	163	9,620	4,902	2.55	0.0	yes
OCT.	285	145	8,838	4,503	2.31	0.0	yes
NOV.	315	161	9,464	4,822	2.48	0.0	yes
DEC.	307	156	9,516	4,849	2.56	0.0	yes
Average Objective Limit	395	201	12,037	6,133	2.75	0.01	





RAVENSVIEW Wastewater Treatment Plant 2020 ANNUAL Report  
 Monthly Graphs





RAVENSVIEW Wastewater Treatment Plant

2020 ANNUAL REPORT

Monthly data

**Digested Sludge**

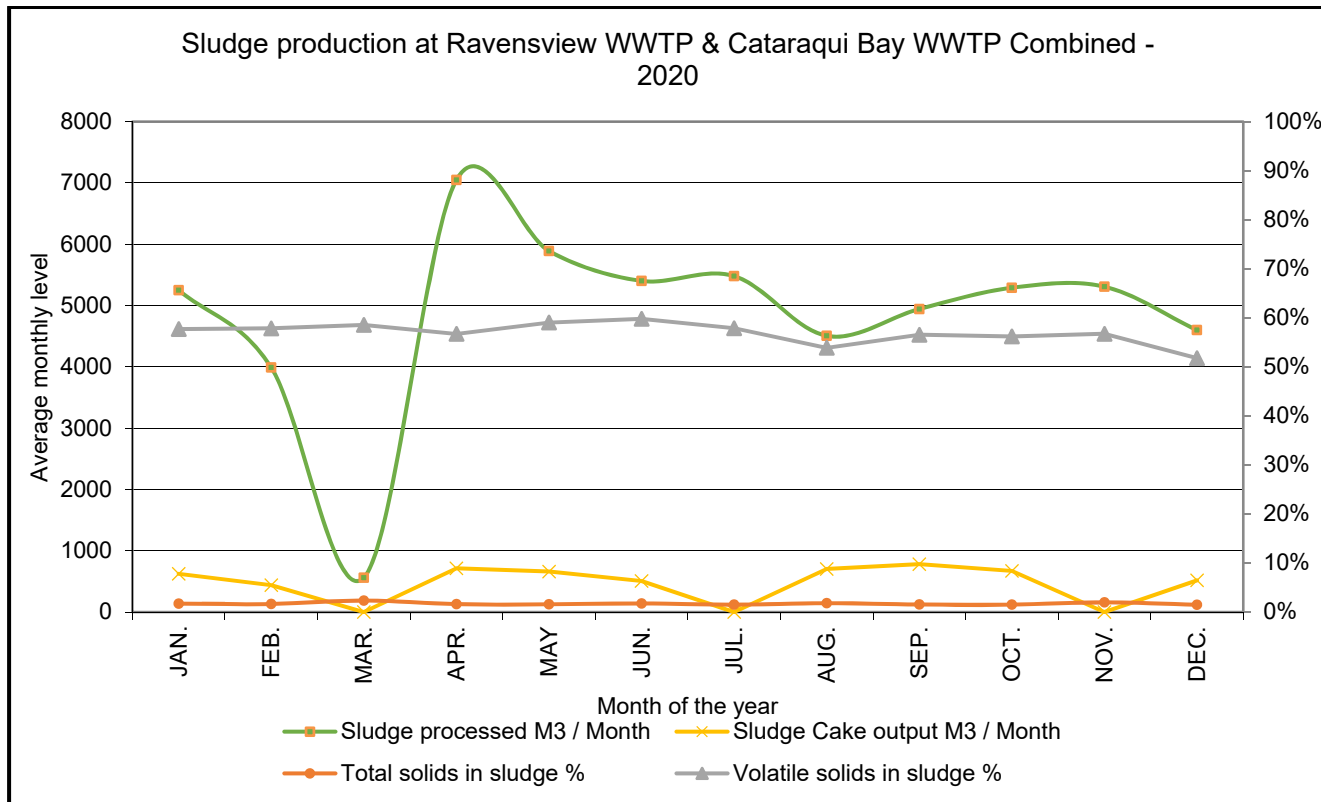
**Sludge Cake**

Month	Unit	<b>Sludge processed</b>	<b>Total solids in sludge</b>	<b>Volatile solids in sludge</b>	<b>Sludge Cake output</b>	<b>Total solids in sludge cake</b>	<b>Vol. Solids sludge cake</b>
		M3 / Month	%	%	M3 / Month	%	%
JAN.		5251	1.7%	57.7%	624	28.8%	55.8%
FEB.		3989	1.6%	57.8%	437	27.3%	57.4%
MAR.		559	2.3%	58.6%	0	0.0%	0.0%
APR.		7051	1.6%	56.7%	711	31.0%	59.4%
MAY		5891	1.6%	59.0%	661	29.8%	58.0%
JUN.		5403	1.8%	59.8%	506	29.5%	60.3%
JUL.		5481	1.5%	57.9%	0	30.2%	56.5%
AUG.		4506	1.8%	53.9%	703	29.6%	59.0%
SEP.		4944	1.5%	56.5%	780	25.3%	61.9%
OCT.		5291	1.5%	56.2%	669	23.9%	56.8%
NOV.		5308	2.0%	56.7%	0	0.0%	0.0%
DEC.		4600	1.5%	51.8%	516	28.8%	55.8%
Average		4,856	1.7%	56.9%	467	23.7%	48.4%
Total		58273				0.0%	

\*Processed volumes are a combination of both Cataraqui Bay WWTP & Ravensview WWTP Sludge Productions



RAVENSVIEW Wastewater Treatment Plant 2020 ANNUAL REPORT  
 Monthly Graphs





## RAVENSVIEW Wastewater Treatment Plant

## 2020 ANNUAL REPORT

## Monthly data

**Digester Gas Production**

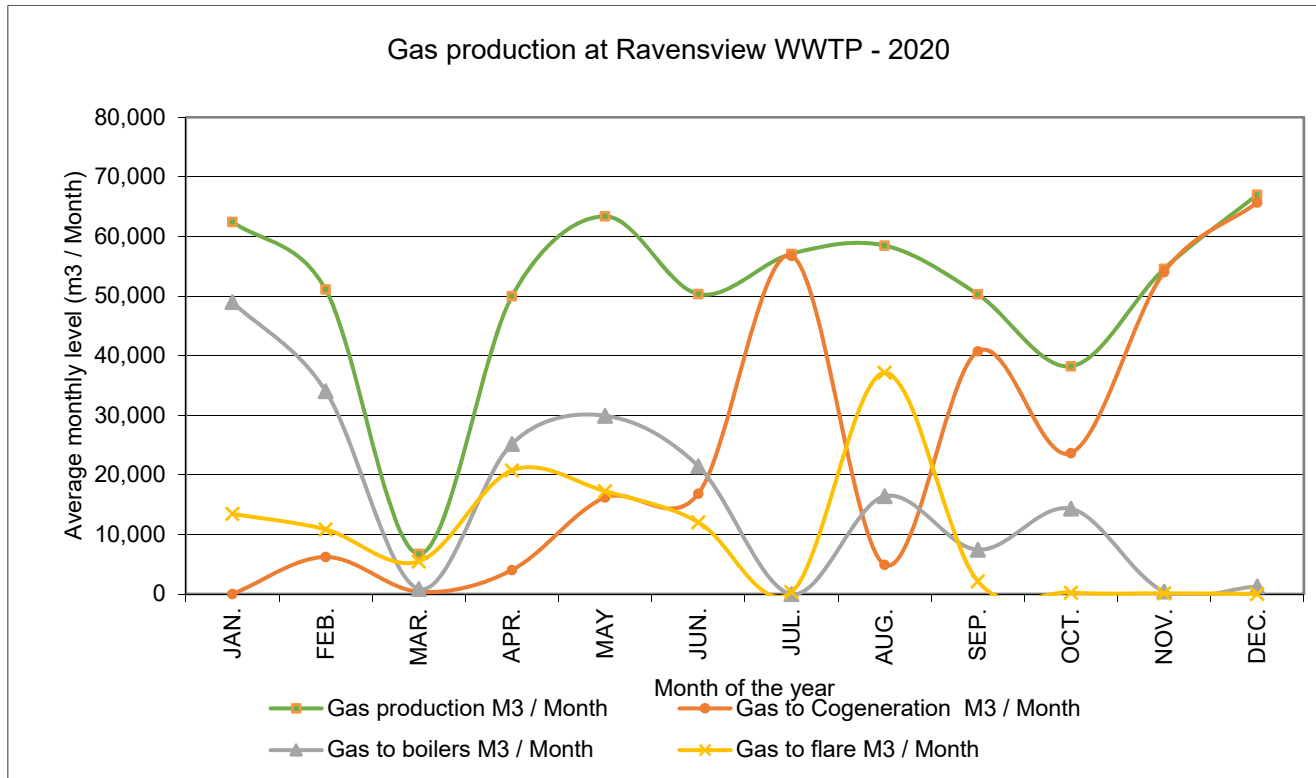
Month	Unit	<b>Gas production</b> M3 / Month	<b>Gas to Cogeneration</b> M3 / Month	<b>Gas to boilers</b> M3 / Month	<b>Gas to flare</b> M3 / Month
JAN.		62,453	0	48,988	13,465
FEB.		51,103	6,221	34,047	10,835
MAR.		6,735	388	866	5,481
APR.		49,971	4,026	25,190	20,755
MAY		63,377	16,219	29,900	17,258
JUN.		50,340	16,837	21,442	12,061
JUL.		57,082	56,760	0	322
AUG.		58,480	4,916	16,418	37,146
SEP.		50,297	40,711	7,434	2,152
OCT.		38,219	23,655	14,319	245
NOV.		54,569	54,018	429	122
DEC.		67,008	65,694	1,278	36
<b>Average</b>		50,803	24,120.4	16,692.6	9,989.8
<b>Total</b>		<b>609,634</b>	<b>289,445</b>	<b>200,311</b>	<b>119,878</b>



# RAVENSVIEW Wastewater Treatment Plant

## 2020 ANNUAL REPORT

### Monthly data





# RAVENSVIEW Wastewater Treatment Plant

## 2020 ANNUAL REPORT

### Monthly data

#### Effluent Summary from daily samples

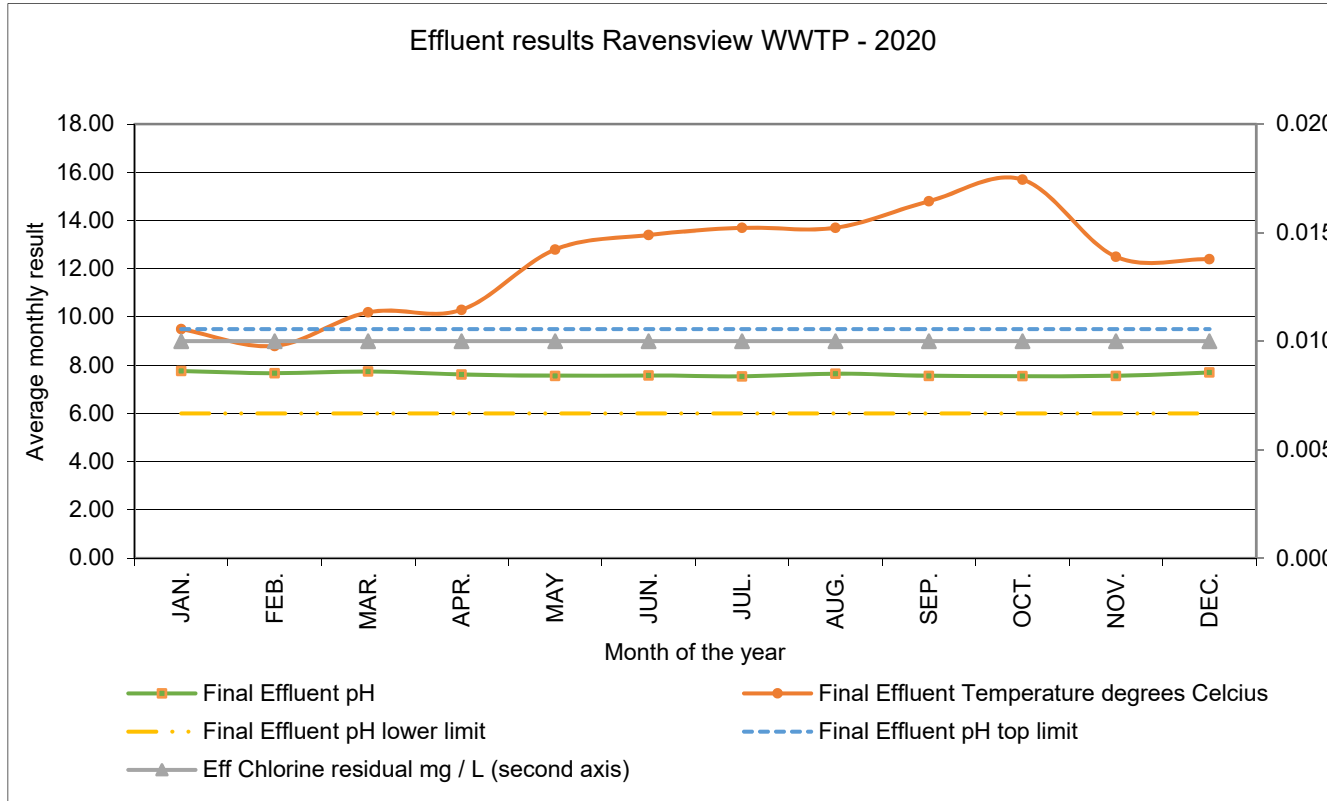
Month	Final Effluent pH	Final Effluent pH lower limit	Final Effluent pH top limit	Final Effluent Temperature degrees Celsius	Eff Chlorine residual mg / L (second axis)
	Unit				
JAN.	7.76	6	9.5	9.5	0.0
FEB.	7.67	6	9.5	8.8	0.0
MAR.	7.74	6	9.5	10.2	0.0
APR.	7.62	6	9.5	10.3	0.0
MAY	7.56	6	9.5	12.8	0.0
JUN.	7.58	6	9.5	13.4	0.0
JUL.	7.54	6	9.5	13.7	0.0
AUG.	7.65	6	9.5	13.7	0.0
SEP.	7.56	6	9.5	14.8	0.0
OCT.	7.55	6	9.5	15.7	0.0
NOV.	7.56	6	9.5	12.5	0.0
DEC.	7.70	6	9.5	12.4	0.0
Average Objective Limit	7.6			12.3	0.01



# RAVENSVIEW Wastewater Treatment Plant

## 2020 ANNUAL REPORT

### Monthly data





RAVENSVIEW Wastewater Treatment Plant

2020 ANNUAL REPORT

Monthly data

**Polymer Dosage**

Month	Unit	Dosage* Kg / day	Dosage Kg / month	Dosage mg / L
JAN.		3	85	0.04
FEB.		3	82	0.05
MAR.		3	87	0.04
APR.		3	124	0.06
MAY		3	96	0.04
JUN.		3	76	0.04
JUL.		2	82	0.05
AUG.		3	74	0.05
SEP.		3	74	0.06
OCT.		3	86	0.07
NOV.		3	74	0.06
DEC.		3	89	0.06
Average		2.92	86	0.05
Objective				
Limit				

Note: \*Calculated value

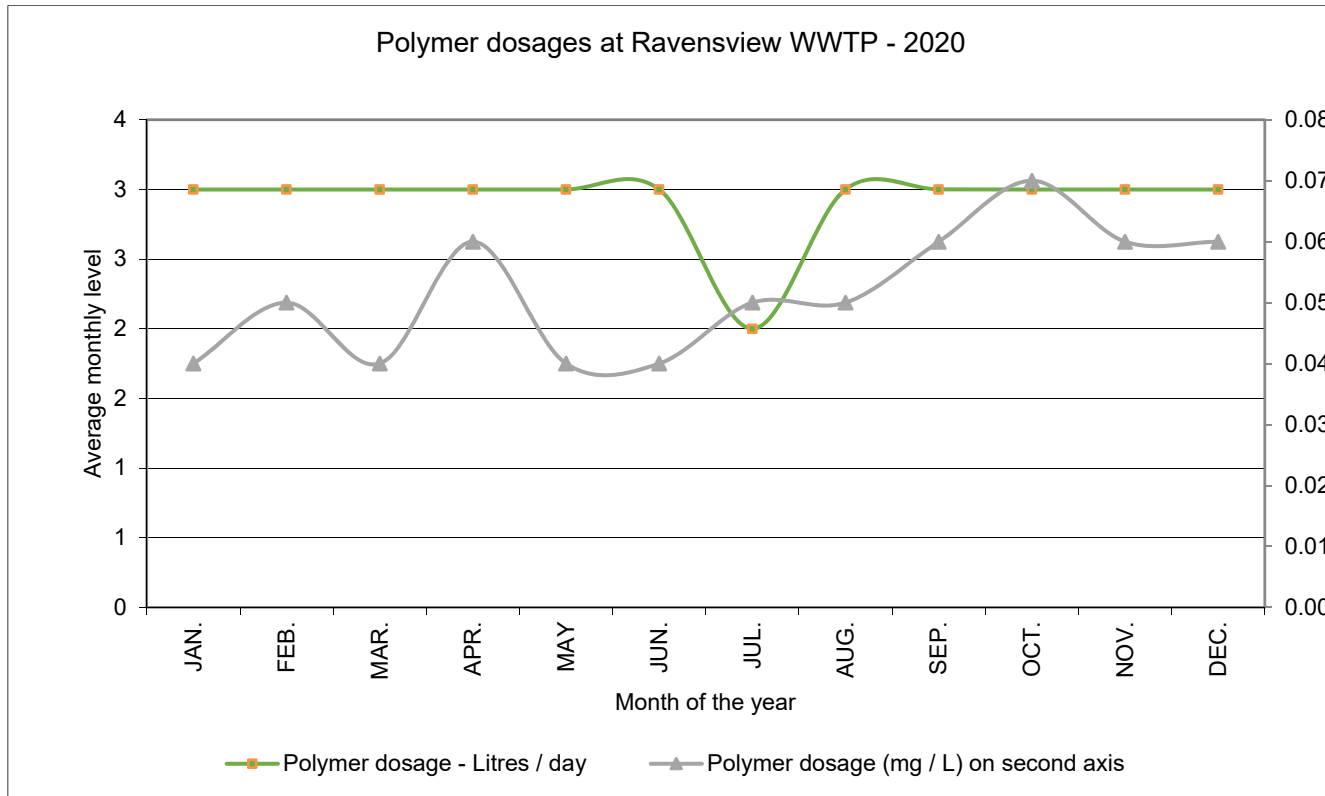




# RAVENSVIEW Wastewater Treatment Plant

## 2020 ANNUAL REPORT

### Monthly data





RAVENSVIEW Wastewater Treatment Plant  
2020 ANNUAL REPORT

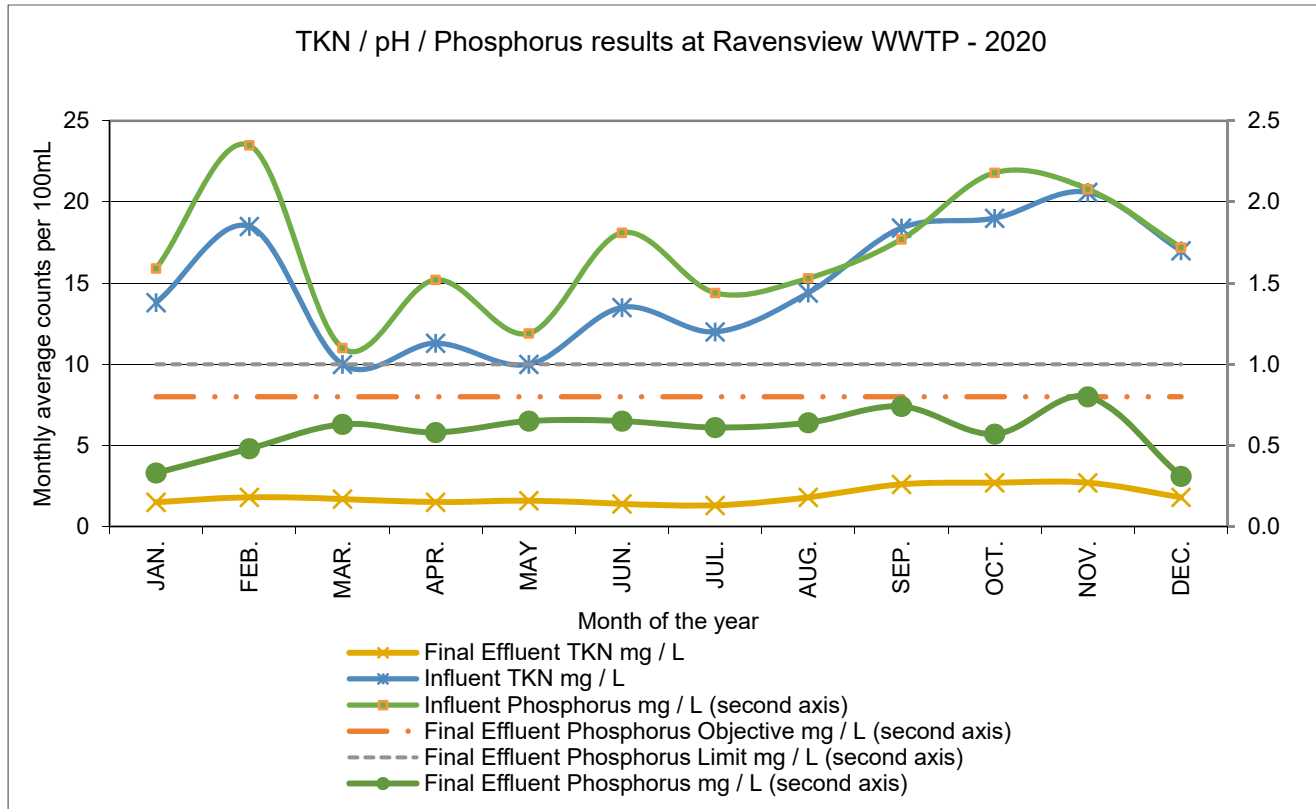
Monthly data

TKN/ Influent pH /Phosphorus

Month	Influent TKN	Final Effluent TKN	Removal TKN	Influent pH	Influent Phosphorus mg / L (second axis)	Final Effluent Phosphorus mg / L (second axis)	Removal Phosphorus
Unit	mg / L	mg / L	%				%
JAN.	13.80	1.50	89%	7.76	1.59	0.33	79%
FEB.	18.50	1.80	90%	7.78	2.35	0.48	80%
MAR.	10.00	1.70	83%	7.80	1.10	0.63	43%
APR.	11.30	1.50	87%	7.77	1.52	0.58	62%
MAY	10.00	1.60	84%	7.68	1.19	0.65	45%
JUN.	13.50	1.40	90%	7.80	1.81	0.65	64%
JUL.	12.00	1.30	89%	7.73	1.44	0.61	58%
AUG.	14.40	1.80	88%	7.72	1.53	0.64	58%
SEP.	18.40	2.60	86%	7.71	1.77	0.74	58%
OCT.	19.00	2.70	86%	7.69	2.18	0.57	74%
NOV.	20.60	2.70	87%	7.65	2.08	0.80	62%
DEC.	17.00	1.80	89%	7.73	1.72	0.31	82%
Average	14.88	1.87	87%	7.74	1.69	0.58	64%
Objective						0.8	
Limit						1.0	



# RAVENSVIEW Wastewater Treatment Plant 2020 ANNUAL REPORT





RAVENSVIEW Wastewater Treatment Plant  
2020 ANNUAL REPORT

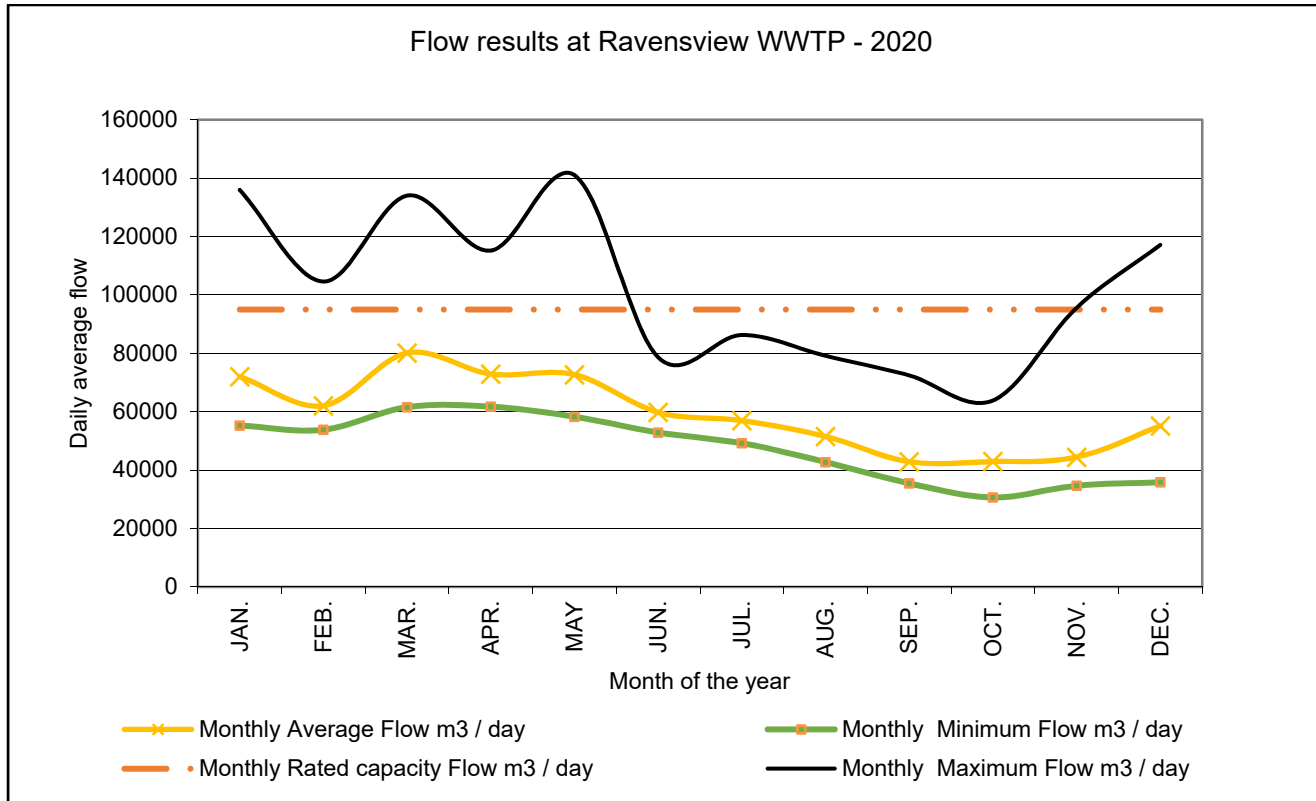
Monthly data

**Flows**

Month	Monthly Minimum Flow	Monthly Rated capacity Flow	Monthly Maximum Flow	Monthly Average Flow	Monthly Total Flow	Monthly Total Grit removal (Estimate)
Unit	m3 / day	m3 / day	m3 / day	m3 / day	m3 / Month	m3 / Month
JAN.	55,252	95,000	135,940	72,028	2,232,864	2
FEB.	53,789	95,000	104,555	62,019	1,798,538	2
MAR.	61,545	95,000	133,995	80,105	2,483,254	2
APR.	61,721	95,000	115,155	72,873	2,186,178	2
MAY	58,260	95,000	141,016	72,678	2,253,032	2
JUN.	52,847	95,000	78,594	59,767	1,793,022	2
JUL.	49,198	95,000	86,248	56,924	1,764,640	2
AUG.	42,706	95,000	79,126	51,514	1,596,928	2
SEP.	35,452	95,000	72,412	42,850	1,285,499	2
OCT.	30,612	95,000	63,825	42,938	1,331,092	2
NOV.	34,616	95,000	95,580	44,385	1,331,554	2
DEC.	35,821	95,000	117,120	55,137	1,709,254	2
Average Objective Limit	47,652	95,000	101,964	59,435	1,813,821	2.0



# RAVENSVIEW Wastewater Treatment Plant 2020 ANNUAL REPORT



# CATARAQUI BAY WASTEWATER TREATMENT PLANT



## 2020 ANNUAL REPORT



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## REPORT CHECK LIST

Annual report submitted for the Environmental Compliance Approval number 3714-9YURZF.

Condition 11(6) the first annual report shall cover the period from the commencement of operation of the sewage works to the end of the calendar year and shall be submitted within sixty (60) days following the end of such reporting period. Each subsequent annual report shall be submitted within sixty (60) days following the end of the calendar year being reported upon.

Condition 11(6)(a) to (l). Each annual report shall contain at least the following information:

- Executive Summary
- Tabulation and comprehensive interpretation of all monitoring data and analytical results collected during the reporting period, and a comparison to the effluent quality and quantity.
- Summary of all maintenance carried out on any major structure, equipment, apparatus, mechanism, or thing forming part of the works.
- Description of all operating problems encountered, and corrective actions taken during the reporting period.
- Tabulation of the volume of sludge generated in the reporting period and an outline of anticipated volumes to be generated over the next reporting period, and an outline of the sludge handling methods and disposal areas to be utilized over the next reporting period.
- Evaluation of the calibration and maintenance procedures conducted on all monitoring equipment.
- Summary of effluent quality assurance or control measures undertaken.
- Summary of any complaints.
- Summary of all by-passes.
- Evaluation for the need for modifications to the works to improve performance and reliability and to minimize upsets and bypasses.





## EXECUTIVE SUMMARY

The Cataraqui Bay Wastewater Treatment Plant (WWTP) was compliant with all concentrations, loadings, sampling, and maintenance as required in environmental compliance approval (ECA) number 3714-9YURZF. Additional details can be found in the tables contained in Appendix A.

The average flows through the plant decreased slightly in 2020 to 27,189 m<sup>3</sup>/day.

Plant staff continue to maintain operations during the facility upgrades and have continued with planned and reactive maintenance as well as capital works at both the facility and within the associated collection system. Details regarding these improvements are in the report.

We have continued to provide additional training to staff at the facility to increase their knowledge of the process upgrades currently underway.

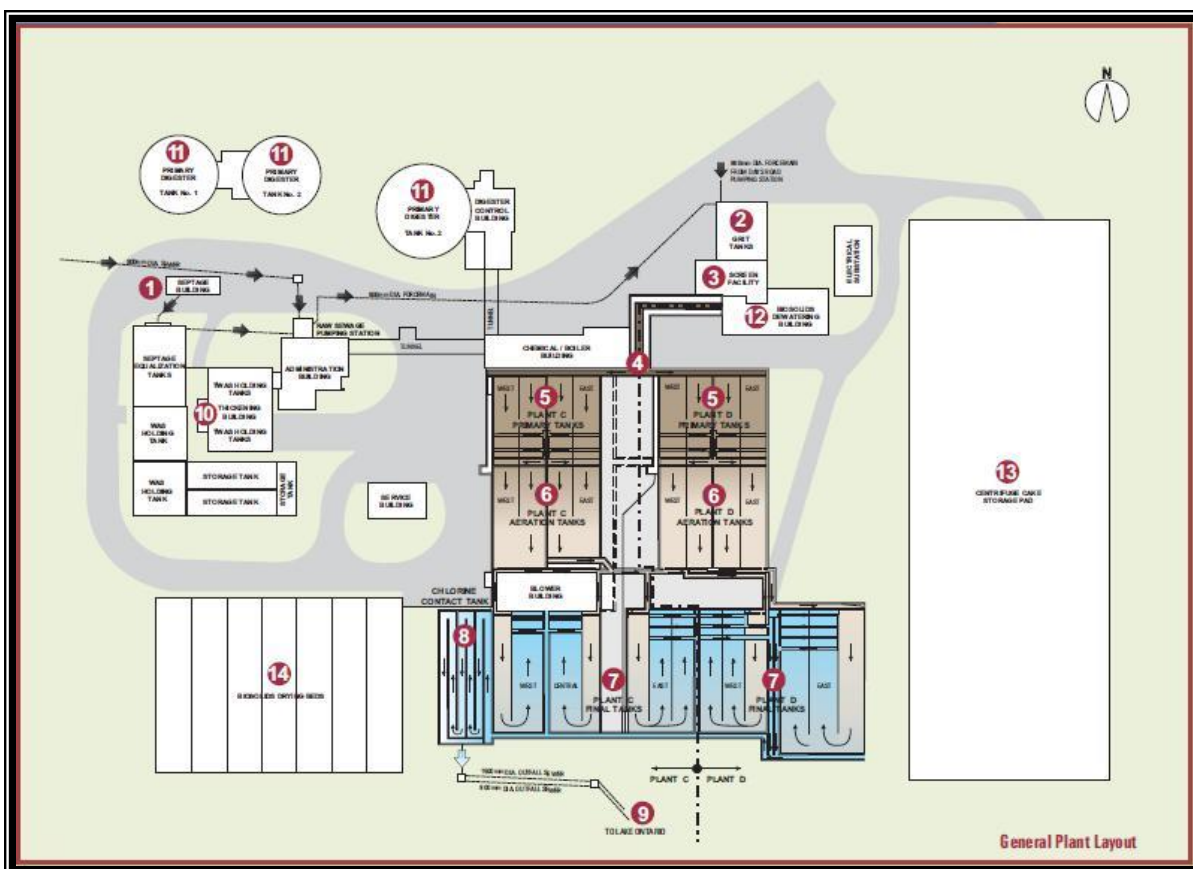
There was one secondary bypass event at the Cataraqui Bay WWTP and three bypass events within the Kingston West Sewage Collection System in the 2020 reporting year. All by-pass details are listed in Table 7, the Bypass Summary section of this report. All the bypasses were due to rainfall events.



## PLANT OVERVIEW

The following is a process overview and description of the treatment steps taken at the Cataraqui Bay wastewater treatment plant. The descriptions contained within this report relate to ECA number 3714-9YURZF.

A detailed description of the upgraded WWTP will be provided when the facility performance report relates to ECA number 4163-ACPPRK.



### Grit Removal

The first step in the treatment process is grit removal. This is accomplished by introducing air into the bottom of the grit channel. The heavier solids in the wastewater settle to the bottom of the tank, while the organics required to be treated stay in suspension and move on to the next treatment step.



## Screening

The second operation is the removal of large particles and floating debris such as wood, rags and plastics from the raw water. These items are removed using mechanical screens that rake the debris from the wastewater stream and onto a belt conveyor.

## Flow Splitting

The screened wastewater discharges into a channel where a flow splitter divides the flow into two separate channels that lead to both C and D plants. The channels are equipped with motorized gate valves to control the flow rate to each plant.

## Primary Settling

The heavier organics settle by gravity to the bottom of the primary clarifiers and form a sludge blanket on the bottom of the tank. The settled sludge is collected by longitudinal collector flights and scraped into a hopper at the end of the tank. The settled sludge is then pumped to digestion facilities for further treatment. As wastewater is discharged from the primary clarifiers, it is dosed with aluminum sulphate for phosphorus removal.

## Aeration

Aeration is the biological process that involves the assimilation of organic insoluble and soluble matter by the action of microorganisms. The microorganisms flourish under stable conditions of respiration through air supply and food provided by the primary clarifier effluent. The aeration process effectively removes 95% of the biochemical oxygen demand from the incoming wastewater.

## Final Settling

After the assimilation is completed in the aeration tanks, the mixed liquor from these tanks flows into the final clarifiers for solid-liquid separation. The biomass formed in the aeration tanks settles to the bottom of the final clarifiers, where a portion is returned to the head of the aeration tanks to continue assimilation of the food in the primary effluent and the remainder is pumped to sludge thickening facilities.

## Disinfection

The supernatant effluent from the final clarifiers is then directed to the disinfection facilities. Chlorine is dosed to the wastewater just prior to entering the chlorine contact tank where disinfection of the final effluent occurs. Just after exiting the chlorine contact tank the wastewater is dosed with calcium thiosulphate for de-chlorinating to ensure no chlorine remains in the water entering the receiving stream.



## **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 sewer. The diffusers at the ends of the sewer lines are located 25 m offshore and 16 m below water surface level.

## **Sludge Thickening**

The sludge thickening facility consists of two rectangular holding tanks, dual rotating drum thickeners and a polymer system. Sludge is thickened from 0.5% solids to approximately 3.5% solids before being pumped to the digester facilities.

## **Biosolids Management**

The sludge from the primary and final clarifiers as well as the sludge from the thickening process is pumped to the digestion facilities. The digester facilities consist of one primary digester, one secondary digester and a holding tank. In the primary digester, the sludge is heated, mixed and re-circulated under controlled anaerobic conditions. 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. 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.

## **Biosolids Dewatering**

The biosolids produced through digestion are dewatered by centrifugation. The centrifuged cake produced is land applied when weather and crops permit. The amount of dewatered sludge produced was 3075 mt that was land applied.

## **PLANT PERFORMANCE**

The enclosed performance assessment summarizes and confirms the facility's compliance. Refer to appendix A for detailed tables and graphs for various parameter results.

All effluent quality and quantity parameters outlined in conditions 6 and 7 of ECA number 3714-9YURZF were compiled during the reporting period of 2020.

The following tables summarize the results obtained through monitoring of plant performance in accordance with conditions 6 and 7 of the ECA number 3714-9YURZF. Effluent objective and limits for ECA number 4163-ACPFRK will become effective once the facility upgrades are complete.

**Table 1: Effluent Results**

Effluent Parameter	Objective (mg/l)	2020 Results (avg.)
CBOD <sub>5</sub>	15.0	4.9 mg/l
Total suspended solids (TSS)	15.0	5.7 mg/l
Total Phosphorus	1	0.42 mg/l
Total Chlorine Residual	<0.02	0.01 mg/l
E. Coli (Monthly Geometric Mean Density)	200 counts/ 100 ml	26 counts/ 100 ml

**Table 2: Effluent Limits**

Effluent Parameter	Concentration Limit (mg/l)	Loading Limit from effluent (kg/d)	2020 annual average (kg/d)
CBOD <sub>5</sub>	25.0	970	123
Suspended solids (TSS)	25.0	970	145
Total Phosphorus	1.0	39	11.4
Total Chlorine Residual	0.02		0.01

**Table 3: Monthly Effluent Parameters**

Month	CBOD5 max concen/max loading (mg/L_kg/day)	TSS max concen/max loading (mg/L_kg/day)	TP max concen/max loading (mg/L_kg/day)	E. coli (Monthly geometric mean density)
January	12mg/L - 90kg/day	12mg/L 390kg/day	0.89mg/l 34kg/day	65
February	6mg/L-200kg/day	8mg/L 200kg/day	1.07mg/l 24kg/day	200
March	5mg/L-200kg/day	12mg/L 400kg/day	0.61mg/l 26kg/day	11
April	4mg/L-100kg/day	11mg/L 290kg/day	0.89mg/l 23kg/day	26
May	6mg/L-100kg/day	7mg/L 200kg/day	2.53mg/l 200kg/day	5
June	5mg/L-100kg/day	10mg/L 200kg/day	0.91mg/l 24kg/day	20
July	6mg/L-100kg/day	13mg/L 300kg/day	1.42mg/l 31kg/day	3
August	6mg/L-200kg/day	13mg/L 100kg/day	0.81mg/l 14kg/day	45
September	8mg/L-200kg/day	11mg/L 250kg/day	0.81mg/l 19kg/day	27
October	6mg/L-100kg/day	13mg/L 310kg/day	0.72mg/l 17kg/day	89
November	14mg/L-530kg/day	24mg/L 910kg/day	0.83mg/l 30kg/day	90
December	13mg/L-320kg/day	26mg/L 650kg/day	2.4mg/l 71kg/day	23

**Table 4: Annual Plant Flows**

Parameter	2014	2015	2016	2017	2018	2019	2020
Avg. m <sup>3</sup> /day	27145	26147	26072	30042	28963	29251	27189
Max. m <sup>3</sup> /day	90801	56583	67405	121860	94957	91976	82297
Design. M <sup>3</sup> /day	38800	38800	38800	38800	38800	38800	38800
% (daily/design)	70.0%	67.4%	67.2%	77.4%	74.6%	75.4%	75.4%

**Table 5: Annual Effluent Results**

Parameter (mg/L)	2014	2015	2016	2017	2018	2019	2020	LIMITS
CBOD <sub>5</sub>	6	5.3	4.05	3.13	5	4.9	5.3	25
Suspended Solids	6.2	6.5	4.8	5.09	6	5.7	9.2	25
Total Phosphorus	0.61	0.55	0.51	0.55	0.40	0.42	0.68	1.0
Total Chlorine	0.01	0.01	0.018	0.018	0.01	0.01	0.01	<0.02
Acute Lethality	n/a	All Pass	All Pass	All Pass	5 Pass/ 1 Fail	Pass	Pass	Pass

Note: Acute lethality testing was started in 2015.

## MAINTENANCE

In 2020 we continued with our preventative maintenance program of vibration testing, oil analysis and electrical surge protection. Preventative maintenance and inspections were performed on most clarifiers during the summer months.

The following bullet points highlight other major projects completed this year.

- Annual infrared scans on HV electrical
- Routine vibration monitoring
- Diesel generator repair & maintenance

## CAPITAL WORKS

In October 2016 work began on plant wide upgrades. The original proposed project completion timeline was 4 years (2016-2020). Although the original proposed completion date has passed, the Cataraqui Bay WWTP continues to undergo an extensive process, electrical/instrumentation, and mechanical upgrade.

The additional major highlights for capital works in 2020 at the Cataraqui Bay WWTP and associated sewage collection system were:

- Portsmouth Pumping Station upgrade assessment.
- Days Rd Pumping Station design upgrade.
- Continued work on the Wastewater Master Plan assessment.
- A Fats, Oils, Grease monitoring program was initiated to track the frequency at which restaurants are cleaning grease traps, to protect the wastewater collection system and enforce the sewer use by-law.



## OPERATIONS

Preventative maintenance and regular process/equipment inspections allow operational problems to be diagnosed quickly and corrective actions to be taken immediately. Non flushable materials such as wipes, and grease have become more prominent in the sewer system resulting in some operational and maintenance challenges. Utilities Kingston is continuing 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, through social media such as Twitter and Facebook, bill stuffers, information on back of parking tickets, and bus information signs. This has been an ongoing campaign for the past three years with some positive results.

## BIOSOLIDS MANAGEMENT

The dewatering facility is the primary method of solids handling at the Cataraqui Bay facility. The secondary digested sludge is dewatered through a centrifuge and then stored until land application is available during the summer season.

It is too hard to predict exactly where and when we will spread in 2021, as crops and weather will be the major variables that we will be dealing with in the 2021 spreading season. Below are the active C of A's and addresses for the City of Kingston in which spreading can take place.



**Table 6: Biosolids Recipients in 2020**

<u>C Of A and NASM Plan #</u>	<u>Address</u>	<u>Expiry Date</u>
22853	Huffam Rd.	31/12/2021
22855	Lake Rd.	31/12/2021
22901	County Rd.8	31/12/2021
23007	County Rd. 4	31/12/2021
23047	Palace Rd.	31/12/2021
23048	Multiple farms	31/12/2021
23119	Hamilton Rd.	31/12/2021
23425	Parry/Chambers Rd.	31/12/2022
23525	County Rd. 8	31/12/2022
23641	Hamilton Rd.	31/12/2022
23950	County Rd. 8	31/12/2023
24003	Hamilton Rd.	31/12/2023
24091	Multiple farms	31/12/2023
24326	Greater Napanee	31/12/2024
24327	Greater Napanee	31/12/2024

## EQUIPMENT CALIBRATIONS

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

## COMPLAINTS

In the 2020 reporting year, the Cataraqui Bay WWTP received 3 official complaints related to odour. Due to the WWTP upgrades currently underway, and a change in process, H<sub>2</sub>S has been detectable to nearby residents. Investigations are underway to reduce the smells via process adjustments. When the facility upgrade is complete, it is expected that odours will be reduced further.

## BYPASS SUMMARIES

Table 7 summarizes the locations, volumes and durations of bypass events for the reporting year 2020. Table 8 summarizes the test results from samples taken during the 2020 bypass events.

**Table 7: Bypass Events**

<b>Date</b>	<b>Location</b>	<b>Start</b>	<b>Duration</b>	<b>Volume</b>	<b>Reason For</b>	<b>Precip</b>
<b>mm/dd/yyyy</b>		<b>Time</b>	<b>(hr + mins)</b>	<b>(m<sup>3</sup>)</b>	<b>Bypass</b>	<b>(mm)</b>
<b>11/01/2020- 12/01/2020</b>	<b>Cataraqui Bay WWTP (secondary bypass)</b>	<b>22:23</b>	<b>24:27</b>	<b>1875</b>	<b>rain/ rapid snow melt</b>	<b>45.7</b>
<b>11/01/2020- 12/01/2020</b>	<b>Crerar Pumping Station</b>	<b>21:30</b>	<b>16:30</b>	<b>170</b>	<b>rain/rapid snow melt</b>	<b>45.7</b>
<b>30/04/2020- 01/04/2020</b>	<b>Crerar Pumping Station</b>	<b>23:50</b>	<b>4:00</b>	<b>76</b>	<b>Heavy rain/snow melt</b>	<b>48.2</b>
<b>25/12/2020</b>	<b>Crerar Pumping Station</b>	<b>6:30</b>	<b>7:00</b>	<b>91</b>	<b>Heavy rain/snow melt</b>	<b>20.2</b>

**Table 8: Bypass Sampling**

<b>Parameter</b>	<b>Units</b>	<b>Cat. Bay STP Annual Avg.</b>
E coli	Cfu/100mL	150000
CBOD <sub>5</sub>	mg/l	36.75
TSS	mg/l	139
TP	mg/l	3.59
<b>Parameter</b>	<b>Units</b>	<b>Crerar PS Annual Avg.</b>
E coli	Cfu/100mL	128250
CBOD <sub>5</sub>	mg/l	3.9
TSS	mg/l	18.5
TP	mg/l	0.34

**BYPASS RESULT INTERPRETATIONS**

CBOD<sub>5</sub>, TP & TSS results are much the same as typical raw sewage influent to the sewage plant.

**APPENDIX A – MONITORED PARAMETERS RESULTS AND GRAPHS**

For further information about this report or any questions regarding accessibility contact Troy Dickerson at [tdickerson@utilitieskingston.com](mailto:tdickerson@utilitieskingston.com) , or call 613-546-1181 Ext 2 1 9 0.



**CANA**

**WASTEWATER TREATMENT PLANT**



**2020 ANNUAL REPORT**



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## REPORT CHECK LIST

Annual report submitted for the Environmental Compliance Approval number 4021-9WUKDE.

Condition 11(6). The first annual report shall cover the period from the commencement of operation of the sewage works to the end of the calendar year and shall be submitted within sixty (60) days following the end of such reporting period. Each subsequent annual report shall be submitted within sixty (60) days following the end of the calendar year being reported upon.

Condition 11(6) (a) to (l). Each annual report shall contain at least the following information:

- Executive Summary;
- Tabulation and comprehensive interpretation of all monitoring data and analytical results collected during the reporting period, and a comparison to the effluent quality and quantity.
- Summary of all maintenance carried out on any major structure, equipment, apparatus, mechanism, or thing forming part of the works.
- Description of all operating problems encountered, and corrective actions taken during the reporting period.
- Evaluation of the calibration and maintenance procedures conducted on all monitoring equipment.
- A tabulation of the volume of sludge generated, and an outline of anticipated volumes to be generated in the next reporting year.
- Summary of effluent quality assurance or control measures undertaken.
- Summary of any complaints.
- Summary of all by-passes.
- A copy of all Notice of Modifications submitted to the Water Supervisor.



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## EXECUTIVE SUMMARY

ECA # 4021-9WUKDE was issued on July 22, 2015 for the newly constructed Wastewater Treatment Plant (WWTP) replacing the previous ECA for the 44-year-old plant.

Utilities Kingston had previously completed an Environmental Assessment Study for solutions to address the aging Cana WWTP in June 2013. The study identified that a new sewage treatment system using Sequencing Batch Reactor (SBR) technology would be the chosen alternative to replace the existing Cana WWTP. The replacement SBR system has incorporated chemical and physical phosphorus removal and increased design capacity for the facility. The new sewage works has a rated capacity of 125 m<sup>3</sup>/d, and a maximum day design flow of 200 m<sup>3</sup>/d. The average flow through the plant was 70.10 m<sup>3</sup>/d in 2020.

## PLANT OVERVIEW

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

### Raw Sewage Pumping Station

A pre-cast concrete wet well accepts sewage flows from the existing sewer system via an influent manhole, equipped with two pumps, one for duty and one for standby discharging to the preliminary treatment unit. The wet well has a control system and liquid level control system with alarms.

### Preliminary Treatment Unit

The first step in the treatment process is the removal of large particles and floating debris such as wood, rags, and plastics from the raw water. This is accomplished by the preliminary treatment unit which consists of a splitter box housing a 15 mm manual bar screen, sized to handle the peak instantaneous flow of 4.6 L/sec. The splitter box has adjustable weir plates and a perforated drip tray. The flow goes from here to the SBR.

### Secondary Treatment Unit

The second operation is the secondary treatment unit which consists of two SBRs. Each reactor is filled with raw sewage and then mixed and aerated to react (bacteria feeding on waste). Once the reaction has occurred, the solids are settled, and the water is decanted off the top and sent to the post equalization tank. The sludge that collects on the bottom of the tank is pumped goes to the digester unit for further treatment. Each tank operates at a different time so there is a tank always collecting the raw sewage.



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## Post Equalization Tank

The post equalization tank collects the decanted water from the sequencing batch reactors and discharges to the tertiary filter system.

## Chemical Dosing Systems

Phosphorus removal is accomplished using alum, which is injected ahead of a static mixer. Polymer is used as a filter aid and is injected in the SBR effluent after the static mixer.

## 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.

## Ultraviolet (UV) Disinfection

Two UV disinfection units operate in parallel. Each unit can handle the maximum flow of 200 m<sup>3</sup>/day.

## Outfall

The treated effluent from the plant is discharged into a 27.9-meter-long pipe into an existing watercourse that conveys flow into Colonel by Lake.

## Building and Control Room

There is a control/chemical room which houses the tertiary filtration unit, chemical dosing systems, blowers and all associated electrical equipment.

## Digester Unit

The digester unit consists of a digester tank equipped with fine bubble aeration used to stabilize and store the sludge that came from the SBRs. The supernatant is returned to the influent while the sludge is periodically hauled to Ravensview Wastewater Treatment Plant in the City of Kingston for further treatment.





## PLANT PERFORMANCE

The following tables summarize the results obtained through monitoring of plant performance:

Table 1: Effluent Objective

Effluent Parameter	Objective (mg/l)	Limits (mg/l)
CBOD <sub>5</sub>	5.0 (Monthly Average)	10 (Annual Average)
Total Suspended Solids (TSS)	5.0 (Monthly Average)	10 (Annual Average)
Total Phosphorus (TP)	0.1 (Monthly Average)	0.2
Total Ammonia Nitrogen	2.0 (Winter, Oct. to Mar.) 1.0 (summer, April to Sept.)	3 Winter 2 Summer
E. coli.	100 CFU/100 milliliters	200 CFU/100mL

Note: pH maintained between 6.5 to 8.5 at all times.



Table 2: Monthly Average Results

Month	CBOD5 mg/l	TSS mg/l	Total Phosphorus mg/l	Total Ammonia Nitrogen	pH	E.coli. CFU/100mL	Acute Lethality
January	2	8.4	0.09	0.31	7.90	1	
February	2	7.0	0.07	0.44	7.98	2	
March	2	6.0	0.07	0.25	7.93	1	
April	2	7.3	0.16	0.21	7.95	1	PASS
May	2	7	0.09	0.18	7.96	1	
June	2	8.5	0.10	0.06	7.99	0	
July	2	7.8	0.11	0.08	8.07	0	
August	2	4.0	0.07	0.23	8.06	0	
September	3	7.0	0.16	0.17	8.03	1	PASS
October	2	4.0	0.10	0.14	8.04	0	
November	2	8.4	0.15	0.11	7.98	0	
December	2	6.0	0.10	0.16	7.98	1	
Annual Average	2.2	6.78	0.11	0.20	7.99	0.67	



**Table 3: Plant Flows**

Parameter	2017	2018	2019	2020
Avg. m <sup>3</sup> /day	137.67	126.58	100.05	70.10
Max. m <sup>3</sup> /day	202.00	189.25	243	110.5
Design. m <sup>3</sup> /day	125	125	125	125
Peak m <sup>3</sup> /day	200	200	200	200
% (daily/design)	110.14%	101.26%	80.04%	56.08%

**Table 4: Surface Water Monitoring**

	CBOD mg/l	TSS mg/l	TP mg/l	Total Ammonia Nitrogen mg/l	Nitrate nitrogen mg/l	E.coli	pH	Temp
<b>UPSTREAM</b>								
<b>1 5 / 0 5 / 20</b>	<b>2</b>	<b>7</b>	<b>0.20</b>	<b>0.01</b>	<b>0.2</b>	<b>61</b>	<b>8.20</b>	<b>7.8</b>
<b>17 / 0 9 / 20</b>	<b>2</b>	<b>188</b>	<b>0.75</b>	<b>0.02</b>	<b>0.1</b>	<b>15</b>	<b>7.60</b>	<b>7.3</b>
<b>DOWNSTREAM</b>								
<b>1 5 / 0 5 / 20</b>	<b>2</b>	<b>5</b>	<b>0.06</b>	<b>0.06</b>	<b>1.9</b>	<b>10</b>	<b>8.17</b>	<b>8.2</b>
<b>1 7 / 0 9 / 20</b>	<b>2</b>	<b>7</b>	<b>0.11</b>	<b>0.10</b>	<b>6.8</b>	<b>4</b>	<b>7.73</b>	<b>7.1</b>

**Table 5: Reportable Bypasses**

Date	Start	Duration (hrs.)	Volume (m3)	Reason	Precip. (mm)
11/01/20	20:45	29.08	87.30	Rain/snow melt	45.8
13/04/20	17:30	6.93	45	Snow/rain	29.1
25/12/20	11:50	10.25	18.48	Rain/snow melt	20.2

**Table 6: Reportable Bypass Sampling**

Parameter	Units	Cana STP Annual Avg.
E coli	Cfu/100mL	5225
CBOD5	mg/l	4.5
TSS	mg/l	41
TP	mg/l	0.80
Total Ammonia	mg/l	0.32

## OPERATING PROBLEMS

Staff continue to optimize the plant processes to ensure continuous, reliable operations.

## SLUDGE GENERATED

There were 14 loads (total volume of 171 m<sup>3</sup>) of sludge collected and brought to Ravensview Wastewater Treatment Plant. The sludge was discharged at the septage facility.

## MAINTENANCE

In 2020 we continued with our preventative maintenance program in accordance with manufacturer's recommendations.

The following bullet points highlight additional maintenance completed this year.

- Modifications to routing of process piping to address operational issues.
- Heat traced alum piping to keep from freezing.

## CAPITAL WORKS

There were no capital works done in 2020 as the plant is newly constructed.

## **OPERATIONS**

Preventative maintenance and regular process/equipment inspections allow operational problems to be diagnosed quickly and corrective actions to be taken immediately.

## **EQUIPMENT CALIBRATIONS**

All Utilities Kingston plant flow meters, online analyzers and lab equipment are calibrated annually by third party contractors. As a result of this proactive approach, the facility saw limited downtime of major equipment and saw very few mechanical or electrical failures this year. Calibration records are available upon request.

## **COMPLAINTS**

There were no official complaints related to the Cana WWTP for the 2020 reporting year.

## **BYPASS**

There were three bypasses at the Cana WWTP in the 2020 reporting year. (See Tables 5 and 6).

## **APPENDIX A – MONITORED PARAMETERS RESULTS AND GRAPHS**

For further information about this report or any questions regarding accessibility contact Troy Dickerson at [tdickerson@utilitieskingston.com](mailto:tdickerson@utilitieskingston.com) , or call 613-546-1181 Ext 2 1 9 0.

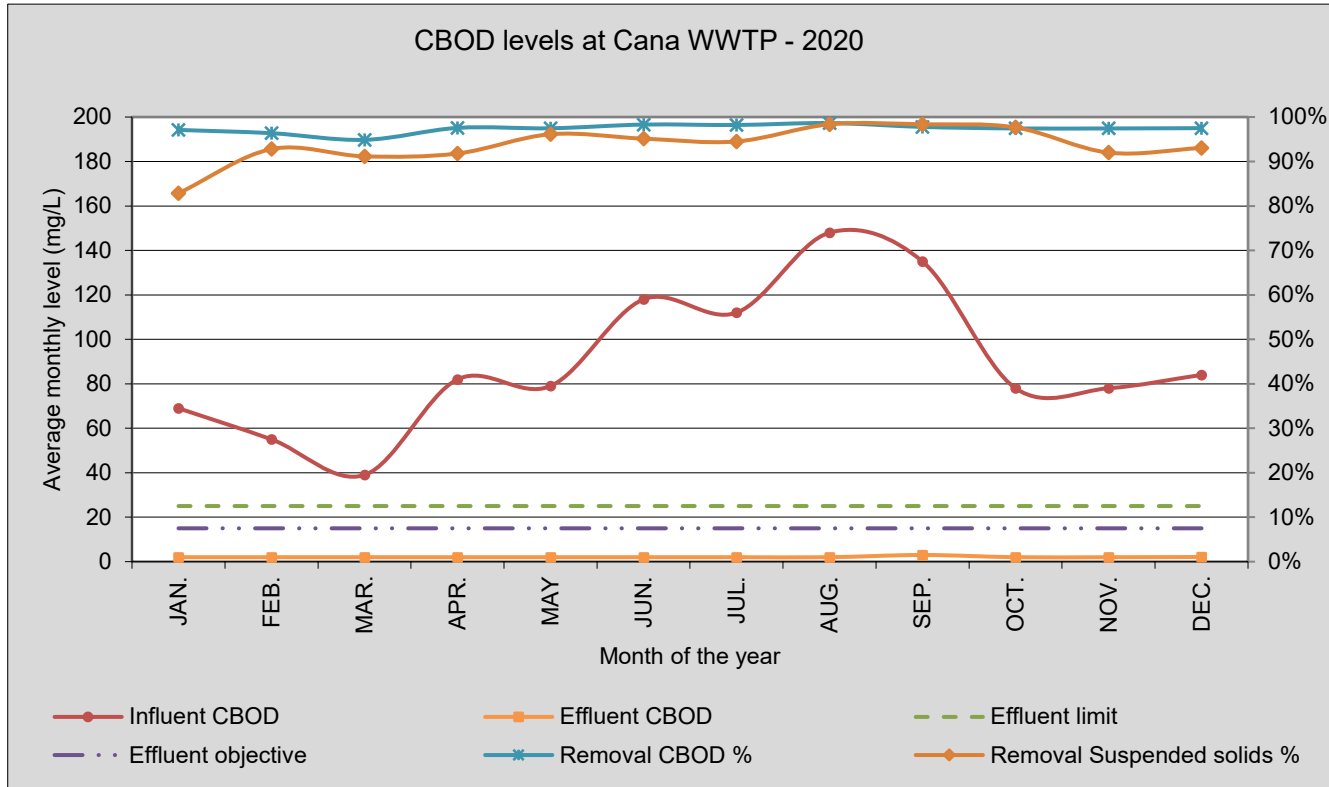


## CANA Wastewater Treatment Plant 2020 ANNUAL REPORT Monthly data

Month	Units	Raw sewage	Final Effluent	Removal	Raw sewage	Final Effluent	Removal
		CBOD mg/L	CBOD mg/L	CBOD %	Suspended solids mg/L	Suspended solids mg/L	Suspended solids %
JAN.		69.0	2.0	97%	49.0	8.4	83%
FEB.		55.0	2.0	96%	68.0	4.9	93%
MAR.		39.0	2.0	95%	52.0	4.6	91%
APR.		82.0	2.0	98%	89.0	7.3	92%
MAY		79.0	2.0	97%	132.0	5.1	96%
JUN.		118.0	2.0	98%	175.0	8.5	95%
JUL.		112.0	2.0	98%	142.0	7.8	95%
AUG.		148.0	2.0	99%	208.0	3.4	98%
SEP.		135.0	3.0	98%	324.0	5.3	98%
OCT.		78.0	2.0	97%	124.0	2.9	98%
NOV.		78.0	2.0	97%	105.0	8.4	92%
DEC.		84.0	2.1	98%	69.0	4.8	93%
Average		89.8	2.1	97%	128.1	6.0	95%
Objective			5.0			5.0	
Limit			10.0			10.0	



# CANA Wastewater Treatment Plant 2020 ANNUAL REPORT Monthly Graphs





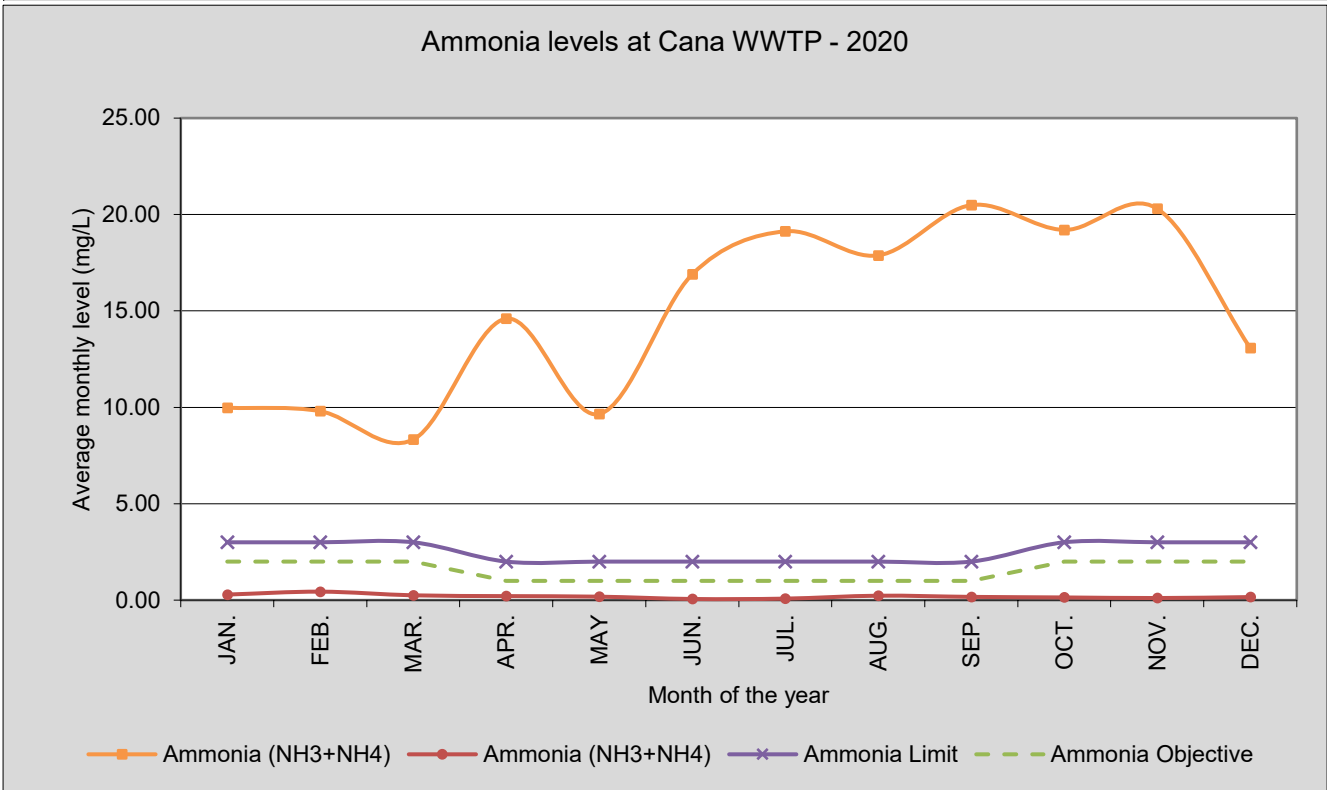
# CANA Wastewater Treatment Plant 2020 ANNUAL REPORT Monthly data

Month	Unit	Final Effluent results				Final Effluent Acute lethality to trout pass / fail
		Raw sewage Ammonia (NH <sub>3</sub> +NH <sub>4</sub> ) mg/L	Final Effluent Ammonia (NH <sub>3</sub> +NH <sub>4</sub> ) mg/L	Final Effluent Ammonia Objective mg/L	Final Effluent Ammonia Limit mg/L	
JAN.		9.98	0.29	2.0	3.00	
FEB.		9.80	0.44	2.0	3.00	
MAR.		8.33	0.25	2.0	3.00	
APR.		14.60	0.21	1.0	2.00	pass
MAY		9.65	0.18	1.0	2.00	
JUN.		16.90	0.06	1.0	2.00	
JUL.		19.13	0.08	1.0	2.00	
AUG.		17.88	0.23	1.0	2.00	
SEP.		20.49	0.17	1.0	2.00	pass
OCT.		19.20	0.14	2.0	3.00	
NOV.		20.30	0.11	2.0	3.00	
DEC.		13.07	0.16	2.0	3.00	
Average Objective Limit		14.94	0.19 Variable Variable			





# CANA Wastewater Treatment Plant 2020 ANNUAL REPORT Monthly Graphs





# CANA Wastewater Treatment Plant 2020 ANNUAL REPORT Monthly data

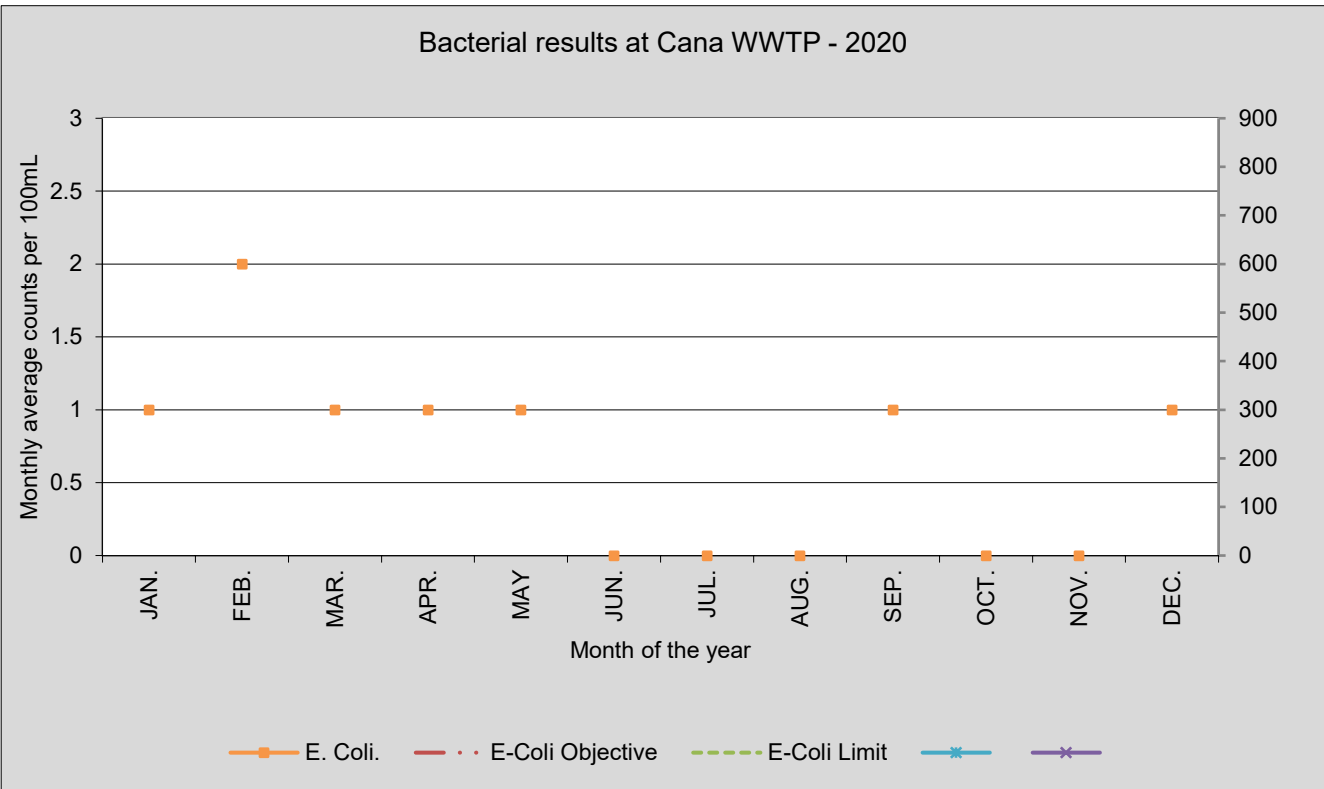
## Bacterial results

### Final Effluent

Month	Unit	E. Coli. counts / 100mL	E-Coli Objective counts / 100mL	E-Coli Limit counts / 100mL
JAN.		1	100	200
FEB.		2	100	200
MAR.		1	100	200
APR.		1	100	200
MAY		1	100	200
JUN.		0	100	200
JUL.		0	100	200
AUG.		0	100	200
SEP.		1	100	200
OCT.		0	100	200
NOV.		0	100	200
DEC.		1	100	200
Average		0.67		
Objective		100		
Limit		200		



# CANA Wastewater Treatment Plant 2020 ANNUAL REPORT Monthly Graphs





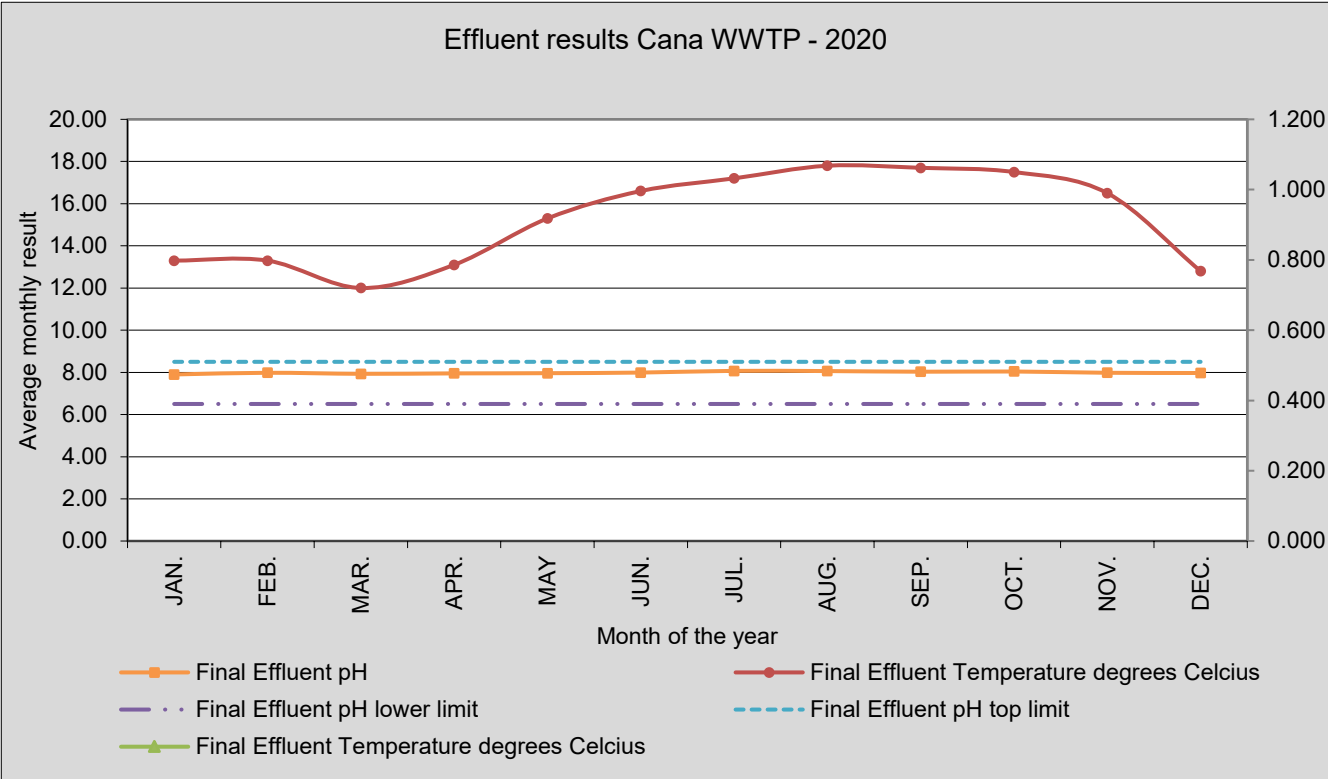
# CANA Wastewater Treatment Plant 2020 ANNUAL REPORT Monthly data

## Effluent Summary from daily samples

Month	Final Effluent pH	Final Effluent pH lower limit	Final Effluent pH top limit	Final Effluent Temperature degrees Celcius
JAN.	7.90	6.5	8.5	13.3
FEB.	7.98	6.5	8.5	13.3
MAR.	7.93	6.5	8.5	12.0
APR.	7.95	6.5	8.5	13.1
MAY	7.96	6.5	8.5	15.3
JUN.	7.99	6.5	8.5	16.6
JUL.	8.07	6.5	8.5	17.2
AUG.	8.06	6.5	8.5	17.8
SEP.	8.03	6.5	8.5	17.7
OCT.	8.04	6.5	8.5	17.5
NOV.	7.98	6.5	8.5	16.5
DEC.	7.97	6.5	8.5	12.8
Average Objective Limit	8.0		6.6	15.3



# CANA Wastewater Treatment Plant 2020 ANNUAL REPORT Monthly Graphs





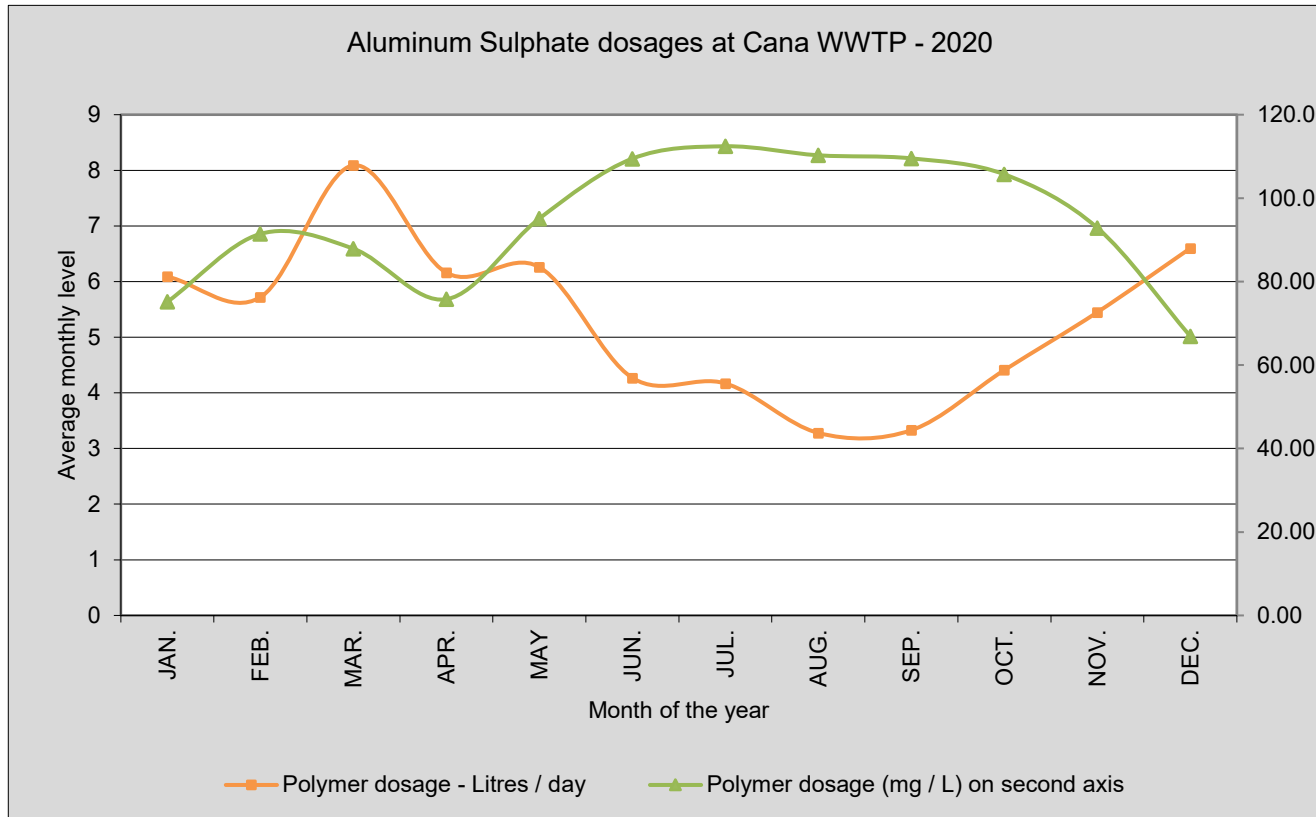
# CANA Wastewater Treatment Plant 2020 ANNUAL REPORT Monthly data

## Aluminum Sulphate dosage

Month	Unit	Dosage* Litres / day	Dosage Litres / month	Dosage mg / L
JAN.		6	189	75.15
FEB.		6	166	91.43
MAR.		8	251	87.89
APR.		6	170	75.77
MAY		6	188	95.13
JUN.		4	124	109.47
JUL.		4	129	112.43
AUG.		3	102	110.27
SEP.		3	97	109.53
OCT.		4	132	105.71
NOV.		5	164	92.87
DEC.		7	156	66.89
Average Objective Limit		5.32	156	94.38



# CANA Wastewater Treatment Plant 2020 ANNUAL REPORT Monthly Graphs





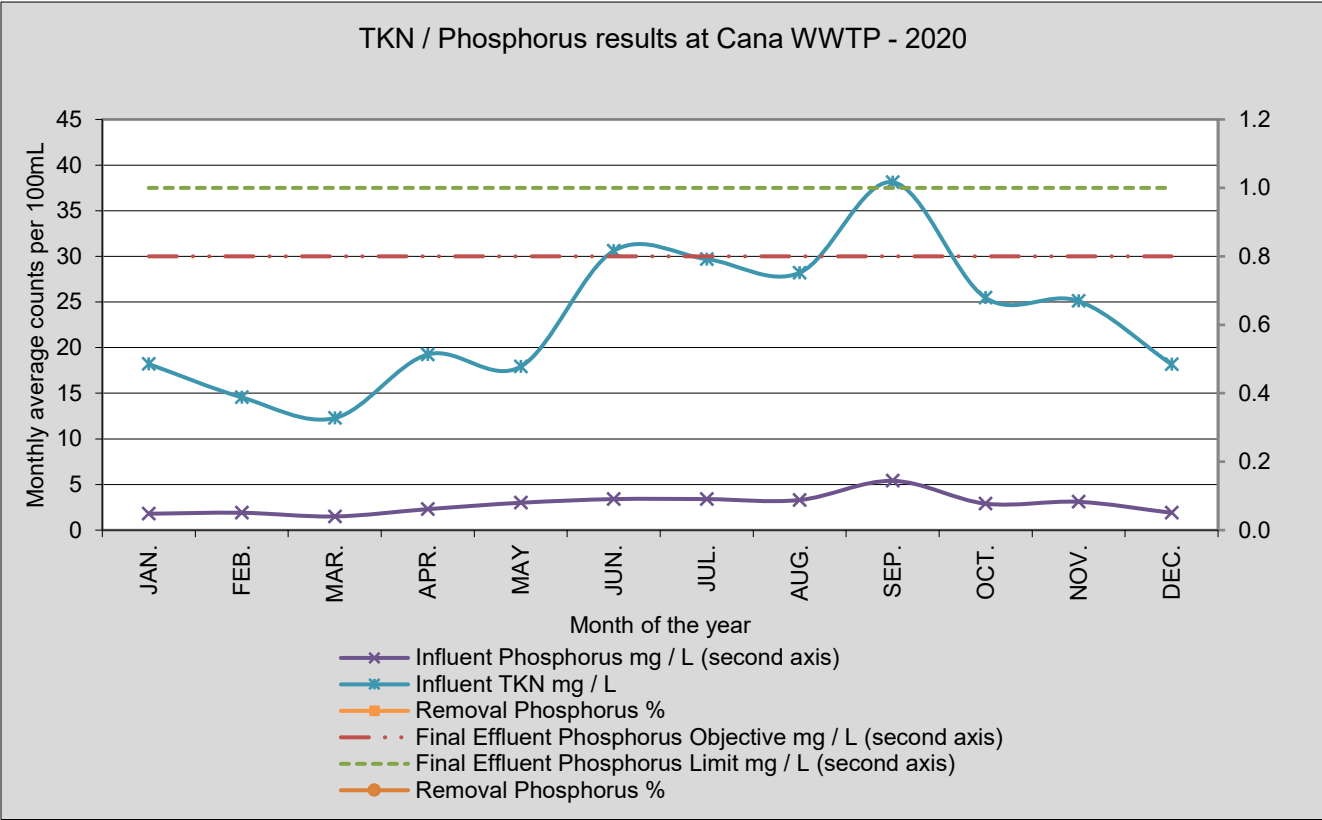
# CANA Wastewater Treatment Plant 2020 ANNUAL REPORT Monthly data

Month	Unit	Influent TKN / Phosphorus			
		Influent	Influent	Final Effluent	Removal
		TKN	Phosphorus	Phosphorus	Phosphorus
		mg / L	mg / L (second axis)	mg / L (second axis)	%
JAN.		18.20	1.80	0.08	96%
FEB.		14.55	1.90	0.07	96%
MAR.		12.28	1.50	0.06	96%
APR.		19.25	2.30	0.11	95%
MAY		17.92	3.00	0.09	97%
JUN.		30.60	3.40	0.09	97%
JUL.		29.70	3.40	0.11	97%
AUG.		28.20	3.30	0.09	97%
SEP.		38.13	5.40	0.15	97%
OCT.		25.46	2.90	0.10	97%
NOV.		25.10	3.10	0.15	95%
DEC.		18.16	1.90	0.14	93%
Average		23.13	2.83	0.10	0.96
Objective				0.1	
Limit				0.2	





# CANA Wastewater Treatment Plant 2020 ANNUAL REPORT Monthly Graphs





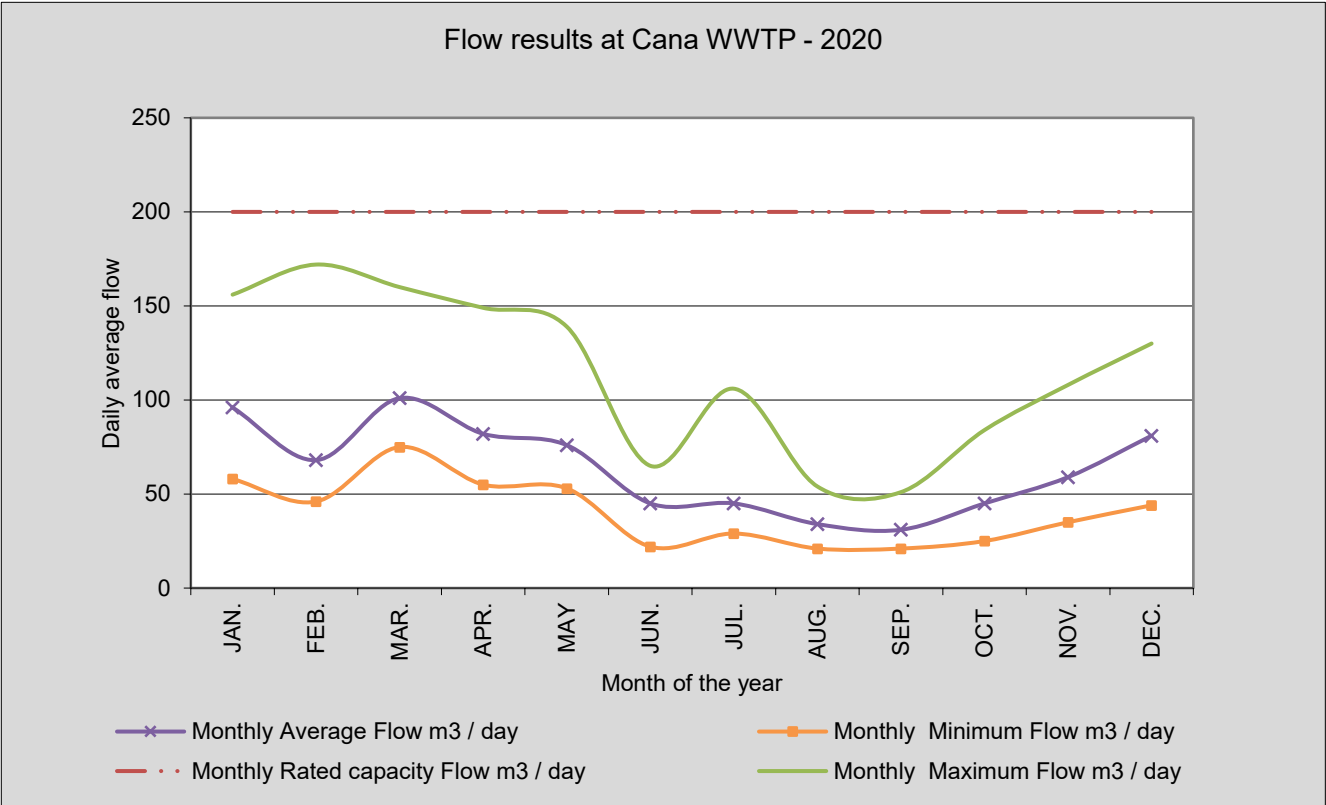
# CANA Wastewater Treatment Plant 2020 ANNUAL REPORT

## Monthly data

Month	Unit	Flows				Total Flow m3 / Month
		Monthly Minimum Flow m3 / day	Monthly Rated capacity Flow m3 / day	Monthly Maximum Flow m3 / day	Monthly Average Flow m3 / day	
JAN.		58	200	156	96	2,976
FEB.		46	200	172	68	1,983
MAR.		75	200	160	101	3,144
APR.		55	200	149	82	2,466
MAY		53	200	139	76	2,345
JUN.		22	200	65	45	3,224
JUL.		29	200	106	45	2,077
AUG.		21	200	54	34	1,321
SEP.		21	200	51	31	1,288
OCT.		25	200	84	45	2,507
NOV.		35	200	108	59	2,600
DEC.		44	200	130	81	2,433
Average Objective Limit		40	200	115	64	2,364



# CANA Wastewater Treatment Plant 2020 ANNUAL REPORT Monthly Graphs





## **2020 ANNUAL REPORT**

# **River Street Pumping Station, Collingwood Combined Sewer Overflow and Orchard Combined Sewer Overflow**



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## REPORT CHECK LIST

Annual report submitted for River St. Pumping Station Environmental Compliance Approval (ECA) number 3237-9EFN85, Collingwood CSO certificate of approval number 2414-63TQET, and Orchard CSO certificate of Approval number 1172-64EMDR. Each annual report shall contain at least the following information:

- Summary and interpretation of all monitoring data and an overview of the success and adequacy of the works.
- Description of any operating problems encountered, and corrective actions taken.
- Summary of all maintenance carried out on any major structure, equipment, apparatus mechanism or thing forming part of works.
- Summary of the calibration and maintenance carried out on all effluent monitoring equipment.
- Summary of any complaints received during the reporting period and any steps taken to address the complaints.
- Summary of all by-pass, spill, or abnormal discharge events.
- Summary of any incidents where the fine screen in the overflow chamber has become completely clogged, resulting in emergency overflow. (River St. Pumping Station only)
- Any other information the District Manager requires from time to time.



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## EXECUTIVE SUMMARY

The River St. Pumping Facility operates under a Ministry of the Environment, Conservation and Parks ECA number 3237-9EFN85. For the reporting year 2020 the facility was compliant with all conditions outlined in condition 7 of the above-mentioned ECA and is briefly described in the following sections of this report.

The total flow through the facility in 2020 was 22,306,100 m<sup>3</sup>.

The facility saw no bypass events in the 2020 reporting year therefore no debris has clogged the overflow screen. It is still visually inspected as needed.

Upgrades began in 2013 and were completed in 2014. Improvements were made in the grit removal system, air treatment, and corrosion control by means of installing a hydrogen peroxide injection system which is operated by U.S. Peroxide.

The Orchard St. (Emma Martin) CSO system operates under the Ministry of the Environment, Conservation and Parks Certificate of Approval #1172-64EMDR.

The total flow through this system in 2020 was 35,170 m<sup>3</sup> with no bypasses occurring.

No repairs had to be done to this system in 2020 and no operating problems were encountered. There was a tank cleanout to remove collected debris.

The Collingwood CSO system operates under the Ministry of the Environment, Conservation and Parks Certificate of Approval #2414-63TQET.

The total flow to sanitary from this system for 2020 was 168,621 m<sup>3</sup>.

The total flow to the lake was 32,647.3 m<sup>3</sup> during bypasses.

There were 4 bypass events from this system in 2020 (See tables 1 & 2).



## EQUIPMENT CALIBRATIONS

All facility flow meters are calibrated annually by third party contractors. As a result of this proactive approach, the facility saw limited downtime of major equipment and saw very few mechanical or electrical failures this year.

## COMPLAINTS

There were no official complaints related to these facilities in 2020.

## BYPASS SUMMARY

Table 1 summarizes the locations, volumes and durations of bypass events for the reporting year 2020. Table 2 summarizes the test results from samples taken during the 2020 bypass events.

**Table 1: Bypass Events**

Date mm/dd/yyyy	Location	Start Time	End Time	Volume (m <sup>3</sup> )	Reason For Bypass	Precip. (mm)
01/11/2020	King-Collingwood CSO	18:37	08:00	15,300	Heavy Rain	38.1
04/13/2020	King-Collingwood CSO	15:54	04:21	6.3	Heavy Rain	29.1
04/30/2020	King-Collingwood CSO	23:30	00:53	1,454	Heavy Rain	47.2
12/25/2020	King-Collingwood CSO	02:07	20:19	15,887	Heavy rain	19.2



**Table 2: Bypass Sampling Results**

Parameter	Units	King-Collingwood and Orchard CSO Annual Avg.
Total Coliform	Cfu/100ml	2,322,222
E coli	Cfu/100ml	322,222
HPC	Cfu/ml	3,590,000
CBOD <sub>5</sub>	mg/l	6.9
TSS	mg/l	60
TP	mg/l	0.66
TKN	mg/l	5.3

### **BYPASS RESULT INTERPRETATIONS**

All bypass discharges have a high bacteria count due to the lack of disinfection. CBOD<sub>5</sub>, TP and TKN results are much lower than typical WWTP raw sewage influent due to the dilution attributed to rainwater during these events. All efforts are made to capture any debris contained in these discharges to the lake. After each bypass event, shoreline inspections near discharge points are done to monitor any debris that may come ashore. Clean up is done if debris is found.

For further information about this report or any questions regarding accessibility contact Troy Dickerson at [tdickerson@utilitieskingston.com](mailto:tdickerson@utilitieskingston.com) , or call 613-546-1181 Ext 2 1 9 0