



**Utilities Kingston  
Report to Council Report  
Number 19-067**

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**To:** Mayor and Members of Council  
**From:** Jim Keech, President and CEO, Utilities Kingston  
**Resource Staff:** Jim Miller, Director Utilities Engineering, Treatment and Human Resources  
**Date of Meeting:** March 5, 2019  
**Subject:** 2018 Water System Annual Compliance Reports and 2018 Wastewater Annual Reports

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**Executive Summary:**

This report provides Council with copies of the Annual Compliance Reports for the three Water Treatment Facilities: King St Water Treatment Plant, Point Pleasant Water Treatment Plant, and Cana Well Water Treatment and Supply System, owned by the City of Kingston and operated by Utilities Kingston. Included with this report are the Annual Reports for the Ravensview, Cataragui Bay and Cana Wastewater Treatment Facilities as well as our major combined sewer overflow facilities.

It is a requirement of the *Safe Drinking Water Act, 2002* that Council receive the Annual Compliance Reports for each of the Water Treatment Facilities prior to their submission to the Ministry of the Environment, Conservation and Parks (MOECP). The Annual Reports for the Wastewater Treatment Facilities are provided for information purposes to Council and require no action. These wastewater reports are also provided to the MOECP.

**Recommendation:**

**That** Council receive the 2018 Annual Compliance Reports for the King Street Water Treatment Plant, The Point Pleasant Water Treatment Plant and the Cana Well Water Treatment Supply System as required by the terms and conditions outlined in Schedule 22 of the Ontario Regulation 170/03.

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**Authorizing Signatures:**

**J.A. Keech, President and CEO,  
Utilities Kingston**

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

Peter Huigenbos, Acting Commissioner, Community Services	Not required
Lanie Hurdle, Acting Chief Administrative Officer	Not required
Desirée Kennedy, Chief Financial Officer & City Treasurer	Not required
Deanne Roberge, Acting Commissioner, Corporate & Emergency Services	Not required

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**Options/Discussion:****Annual Compliance Reports**

The Annual Compliance Reports are a statement as to the compliance with all terms and conditions of Schedule 22 of Ontario Regulation 170/03. There is a compliance report for each water treatment facility, and this report gives 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 contained in Exhibits A, B and C.

Contained within the Annual Compliance Report is a section under the heading "Compliance" with the terms and conditions of the Certificate of Approval/DWWP. This section summarizes the activities of the operators of the water systems 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 2018 reporting period which is summarized below.

**King Street Water Treatment Plant**

There were no instances of non-compliance during the 2018 reporting period.

There were six (6) notifications of adverse water quality reported to the Spills Action Center and the Environmental Division of the Ministry of Health during the 2018 reporting period. Three (3) of the adverse results were associated with Total Coliform counts and three (3) dealt with adverse results associated with lead exceedances. Regarding Total Coliform counts, a notification of adverse water quality was received from the laboratories regarding a sample collected from the distribution system. In all instances 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. Considering the high free chlorine residuals present in the original bacteriological samples and the subsequent resamples did not indicate any adverse conditions, a contaminated sample bottle or sampling error is suspected in each of the instances.

With the three (3) lead exceedances notifications were made to the Environmental Health Division of the local Ministry of Health. The home owners were notified and given a copy of the lab results along with an explanation of the information and a list of possible corrective actions to reduce Lead exposure.

**June 25, 2018** – Notification for total coliform bacteria (TC) with a count of 2cfu/100ml. Free chlorine residuals at the time of sampling were 1.23mg/l. Subsequent resampling and testing was undertaken with no adverse conditions/results.

**September 4, 2018** - Notification for total coliform bacteria (TC) with a count 1 cfu/100ml with a chlorine residual of .47mg/l reported. Resamples were again collected from the same location and came back clear.

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**September 17, 2018-** Notification of an adverse water quality sample with a concentration of lead of 0.0178 mg/l for the first sample and 0.019 mg/l for the second sample. The pH at the time of sampling was 7.9. Homeowner was informed of the results and provided information and a list of possible corrective actions.

**October 10, 2018-** Notification of an adverse water quality sample with a concentration of lead of 0.0117 mg/l. The pH at the time of sampling was 8.15. Homeowner was informed of the results and provided information and a list of possible corrective actions.

**October 11, 2018-** Notification of an adverse water quality sample with a concentration of lead of 0.0126 mg/l in the first sample and 0.0222 mg/l in the second sample. The pH at the time of sampling was 6.78. Homeowner was informed of the results and provided information and a list of possible corrective actions.

**November 14, 2018-** Notification for total coliform bacteria (TC) with a count 43 cfu/100ml with a chlorine residual of 1.59mg/l reported. Resamples were again collected from the same location and came back clear.

With the free chlorine residuals present in all of the 3 above-mentioned samples involving total coliform bacteria and subsequent re-samples not indicating any adverse conditions, contaminated sample bottles or sampling errors were suspected. At no time was there any risk to the water quality.

#### Point Pleasant Treatment Plant

There were no instances of non-compliance during the 2018 reporting period, or any adverse sampling results.

There were no events within the Pt. Pleasant Water Treatment Plant that required notification during the 2018 reporting period.

#### Cana Well System

There were no instances of non-compliance during the 2018 reporting period or any adverse sampling results.

There were no incidents which required notification during the 2018 reporting period. It is noted however that the ground water supply for Cana contains sodium concentrations greater than 20mg/l. Testing throughout the year confirms consistent results exceeding the limit. These results require notification to the Medical Officer of Health and 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 further action is currently required.

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## Wastewater Annual Reports

Annual reports for our wastewater facilities are a requirement identified in the conditions of environmental approvals for each treatment facility, 1 pumping station and 2 Combined Sewer Overflow (CSO) facilities. The annual reports are required to be submitted to the MOECP but are provided to Council for information purposes. The reports provide a useful summary of the past years operations at Ravensview, Cataraqi Bay and Cana; River St Pumping Station and the Orchard and Collingwood CSO facilities.

### Ravensview WWTP

For the year 2018 Ravensview was in compliance with all of the conditions outlined in Condition 7 of the Certificate of Approval issued for Ravensview. Average flows decreased significantly in 2018 to 69,146 m<sup>3</sup>/day from a very wet 2017. The facility experienced three secondary bypass (primary treatment was maintained) events due to wet weather in 2018 and these are listed in Table 7 – the By-pass Summary section of the Annual Report.

### Cataraqi Bay WWTP

For the year 2018 Cataraqi Bay was in compliance with all concentrations, loadings, sampling and maintenance as required in the environmental compliance approval. A sample testing for acute lethality collected on June 20, 2018 indicted a high mortality rate for rainbow trout. Appropriate notifications were issued and immediate resampling occurred which resulted in no mortality of rainbow trout, which confirmed that effluent water was of good quality.

Average flows at Cataraqi Bay decreased slightly from 2017 showing 29,009 m<sup>3</sup>/day. Plant staff continue to maintain operations at this facility while major reconstruction activity occurs. The facility had 6 secondary by-pass events in 2018 (primary treatment was maintained). Five of the six by-passes were due to wet weather events while one was due to an unplanned power outage.

### Cana WWTP

Cana is the newest waste water treatment plant with commissioning of the new facility completed in 2017 and 2018 representing the first full year of operation. Average day flows at Cana for 2018 were 126 m<sup>3</sup>/day. All effluent objectives identified for this facility were met throughout 2018. The facility experienced 4 by-pass events in 2018, all due to wet weather events.

### River St Pumping Station

For 2018 this facility was in compliance with all conditions identified in the Certificate of Approval. The total flows through the station for 2018 was 2.1 million m<sup>3</sup>. The pumping station did not experience any by-passes in 2018.

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Collingwood and Orchard St CSO

The Orchard St CSO managed 108,500 m<sup>3</sup> throughout 2018 with no by-passes occurring.

The Collingwood CSO saw total volumes of 225,000 m<sup>3</sup> in 2018 of which 71,600m<sup>3</sup> was by-passed due to wet weather events. This occurred in 6 separate events. Collingwood is also one of our sites where real time monitoring and public notification of an overflow event occurs.

**Existing Policy/By-Law:**

Not applicable.

**Notice Provisions:**

Not applicable.

**Accessibility Considerations:**

Not applicable.

**Financial Considerations:**

Not applicable.

**Contacts:**

Jim Keech, President and CEO, Utilities Kingston, 613-546-1181 x2217

Jim Miller, Director Utilities Engineering, Treatment and Human Resources 546-1181, 2475

**Other City of Kingston Staff Consulted:**

Not applicable.

**Exhibits Attached:**

Exhibit A - King Street Water Treatment Plant Annual Compliance Report

Exhibit B – Point Pleasant Water Treatment Plant Annual Compliance Report

Exhibit C – Cana Well System Annual Compliance Report

Exhibit D - Cataraqui Bay Wastewater Treatment Facility Annual Report

Exhibit E - Ravensview Wastewater Treatment Facility Annual Report

Exhibit F – Cana Wastewater Treatment Facility Annual Report

Exhibit G – River St Pumping Station, Collingwood CSO and Orchard CSO



# Utilities Kingston

## ANNUAL SUMMARY REPORT 2018

### KING STREET WATER TREATMENT PLANT

WATERWORKS NUMBER: 220001860

#### Reporting Period

January 1, 2018 – December 31, 2018

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



## **ANNUAL SUMMARY REPORT 2018**

### **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 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 Group 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 Underground Infrastructure Department and the Treatment Group 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, contingency plans and operations manuals are established and are located in the appropriate facilities and available to appropriate staff.

A quality management system (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.

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 Safe Drinking Water act, 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 **June 25<sup>th</sup>** for Total Coliform (TC) with a count of **2 cfu/100mL**. Free chlorine residual at the time of sampling was **1.23 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 indicator of adverse water quality was received from Caduceon Environmental Laboratories regarding a sample collected on **September 4<sup>th</sup>** for Total Coliform (TC) with a count of **1 cfu/100mL**. Free chlorine residual at the time of sampling was **0.47 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 indicator of adverse water quality was received from Caduceon Environmental Laboratories regarding samples collected on **September 17<sup>th</sup>** for Lead, which showed results of **0.0178 mg/L (Sample #1) and 0.019 mg/L (Sample #2)**. The pH at the time of sampling was **7.90**. Notifications were made to the Environmental Health Division of the local Ministry of Health. The homeowner was given a copy of the lab results along with an explanation of the information and a list of possible corrective actions to reduce Lead exposure.
- Notification of an indicator of adverse water quality was received from Caduceon Environmental Laboratories regarding samples collected on **October 10<sup>th</sup>** for Lead, which showed a result of **0.0117 mg/L**. The pH at the time of sampling was **8.15**. Notifications were made to the Environmental Health Division of the local Ministry of Health. The homeowner was given a copy of the lab results along with an explanation of the information and a list of possible corrective actions to reduce Lead exposure.
- Notification of an indicator of adverse water quality was received from Caduceon Environmental Laboratories regarding samples collected on **October 11<sup>th</sup>** for Lead, which showed results of **0.0126 mg/L (Sample #1) and 0.0222 mg/L (Sample #2)**. The pH at the time of sampling was **6.78**. Notifications were made to the Environmental Health Division of the local Ministry of Health. The homeowner was given a copy of the lab results along with an explanation of the information and a list of possible corrective actions to reduce Lead exposure.
- Notification of an indicator of adverse water quality was received from Caduceon Environmental Laboratories regarding a sample collected on **November 14<sup>th</sup>** for Total Coliform (TC) with a count of **43 cfu/100mL**. Free chlorine residual at the time of sampling was **1.59 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.

### **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 2018. The serviced population for the King Street WTP and Point Pleasant WTP is 113,382 (population estimate based on growth rates from Census data for 2014). The annual average daily use was 17,955 cubic meters per day from the Point Pleasant WTP and 42,491 cubic meters per day from the King Street WTP for the year of 2018. Total average per capita use was calculated at 402 litres per person/day. The metered residential use for 2018 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 2018.

### **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 2.70 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 2.6 - 8 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 - Peak (Raw) Flows 2018  
m<sup>3</sup>

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	56,000	59,410	57,000	54,630	55,890	59,410	48,390	55,430	48,850	58,000	58,000	62,970
2	67,010	60,120	59,100	51,000	59,510	49,130	58,610	56,960	48,170	50,000	49,610	61,080
3	60,460	59,270	56,360	58,010	48,920	48,970	60,970	60,650	59,210	59,410	37,470	40,680
4	57,410	59,880	60,550	62,030	61,190	48,960	61,290	64,530	61,290	56,360	58,000	39,710
5	60,630	61,350	60,790	61,410	60,640	49,910	61,090	59,200	60,950	53,820	56,030	64,860
6	61,020	61,440	59,860	61,220	49,100	48,660	57,000	47,870	60,010	46,050	51,640	61,430
7	56,000	58,350	49,980	60,710	61,700	49,220	48,860	48,420	55,870	36,120	57,260	57,080
8	60,330	60,340	48,940	48,970	58,000	49,400	61,500	62,040	60,290	49,100	38,230	38,860
9	59,300	59,960	60,400	67,970	62,080	49,140	62,620	60,700	60,340	51,010	39,910	36,830
10	57,730	58,570	61,350	62,500	48,420	49,010	59,290	57,000	47,900	51,000	57,690	58,000
11	59,360	59,900	56,770	57,000	48,940	60,760	49,610	50,000	47,950	59,000	38,000	58,000
12	56,000	60,860	49,240	57,000	48,770	63,970	59,300	49,000	61,680	58,000	61,370	39,630
13	56,000	59,920	60,610	49,730	49,130	63,970	61,230	50,000	60,430	58,000	38,690	60,290
14	58,380	60,080	60,310	62,010	61,000	49,760	61,360	50,000	61,040	59,920	64,680	61,070
15	67,130	57,580	59,740	59,970	49,090	50,000	49,810	59,810	60,760	56,200	65,390	49,220
16	66,790	62,560	57,000	49,920	50,930	52,000	61,890	59,650	60,760	47,860	59,000	49,630
17	68,670	60,130	56,000	57,560	49,160	50,000	62,630	48,760	60,470	64,970	58,000	49,610
18	59,550	48,930	50,000	61,270	59,090	61,230	59,670	47,850	59,150	64,970	58,490	51,970
19	61,320	51,000	58,450	60,300	61,430	61,140	50,520	48,380	67,420	60,500	37,550	51,000
20	59,780	60,580	58,920	50,000	50,140	55,180	57,060	48,650	78,190	59,000	56,980	56,970
21	59,200	57,000	60,450	57,000	58,000	50,380	62,260	47,960	67,110	61,670	50,460	48,180
22	58,340	61,480	61,380	59,240	52,000	50,000	53,160	64,580	47,620	58,000	52,640	48,160
23	59,060	57,210	57,940	59,850	50,000	50,000	49,000	62,390	58,210	59,000	50,600	49,030
24	58,440	48,880	62,330	50,380	58,000	49,000	47,650	58,770	61,700	61,530	55,680	48,000
25	59,370	49,440	62,450	62,500	59,000	48,540	50,000	56,410	56,530	35,790	50,340	47,170
26	59,950	59,950	61,640	60,320	60,850	60,890	48,000	49,980	56,380	58,000	49,270	48,210
27	57,050	60,160	62,150	58,620	54,590	61,600	62,050	47,960	58,230	35,950	54,640	55,170
28	60,290	61,230	59,660	61,910	50,000	54,260	60,980	52,790	50,130	36,720	60,650	47,730
29	58,760		60,270	49,550	58,000	49,470	46,910	61,430	59,720	65,220	49,910	47,830
30	61,190		59,430	49,210	58,000	49,220	62,180	61,580	61,650	38,440	49,840	49,030
31	60,690		59,860		58,000		48,320	50,040		58,000		47,630

Total  
Average  
Min  
Max

68,670	62,560	62,450	67,970	62,080	63,970	62,630	64,580	78,190	65,220	65,390	64,860
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CoA Amount **118,000 m<sup>3</sup>/day**

Yearly Average  
Yearly Min  
Yearly Max **78,190**





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King St. Water Treatment Plant - Treated Water Flows 2018  
m<sup>3</sup>

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	40,600	48,600	49,200	44,100	46,200	43,100	41,900	41,900	42,600	34,000	37,500	38,800
2	50,100	49,000	49,200	42,000	42,000	42,200	43,900	43,500	42,300	33,600	35,600	34,900
3	49,000	46,500	40,200	46,800	41,600	42,300	49,400	44,800	45,700	35,600	31,700	32,000
4	48,900	42,200	49,200	48,300	45,500	42,200	49,000	46,800	49,400	33,700	35,700	32,900
5	45,600	49,100	49,900	48,700	42,700	42,200	49,600	44,300	49,100	35,500	32,400	35,500
6	43,800	49,400	47,800	48,400	41,700	42,100	43,100	42,200	45,200	33,400	36,000	35,900
7	44,600	47,100	42,100	46,300	47,100	42,200	42,200	42,100	43,300	31,400	37,100	33,300
8	49,000	49,000	42,000	41,900	35,600	42,300	44,300	45,200	49,800	32,400	31,900	32,300
9	49,300	48,900	49,400	47,000	47,700	42,200	49,300	45,000	48,500	34,700	32,100	32,400
10	49,300	48,900	49,400	49,400	41,500	42,300	46,200	44,200	42,000	32,700	35,800	39,800
11	48,200	48,800	42,100	48,700	41,900	43,500	42,300	41,800	39,200	36,400	32,300	35,500
12	48,100	49,000	42,000	45,000	41,700	49,200	46,900	41,700	44,200	33,200	34,200	32,400
13	49,100	49,000	45,000	41,800	41,600	43,300	48,300	41,900	48,900	33,600	32,200	35,000
14	49,300	48,800	49,400	45,500	41,700	37,600	42,300	41,700	49,200	35,600	33,600	41,600
15	51,200	49,200	49,600	46,600	42,100	38,900	42,300	44,200	37,800	33,600	35,600	42,800
16	47,700	49,100	49,300	41,900	42,700	42,000	46,400	46,500	49,500	32,900	34,900	32,200
17	47,000	48,600	46,800	43,700	42,500	42,000	49,400	41,900	49,800	36,000	36,600	41,400
18	49,200	42,000	42,100	49,200	42,800	46,800	44,700	41,800	43,900	33,100	33,500	38,500
19	49,000	41,900	49,500	46,800	47,600	47,400	42,600	42,000	42,900	35,600	32,300	42,100
20	49,100	48,300	49,300	42,500	33,800	42,300	45,000	42,100	44,100	32,700	37,800	44,000
21	49,100	48,600	48,500	44,600	44,800	41,900	49,400	42,000	43,000	34,000	32,600	41,900
22	49,300	48,800	42,300	46,700	42,400	41,900	42,700	38,100	42,100	34,300	34,000	41,800
23	48,900	42,500	44,600	43,000	42,300	41,900	41,800	41,500	45,000	36,100	41,200	37,500
24	48,900	41,900	49,200	42,600	46,700	41,900	41,400	47,100	41,100	34,100	36,100	41,800
25	49,300	41,800	49,300	44,900	42,800	41,900	42,100	39,100	37,600	31,700	37,300	38,000
26	45,300	49,100	49,200	43,500	49,300	45,300	41,700	42,000	34,500	35,200	30,200	34,900
27	43,900	49,100	49,300	45,000	42,800	47,500	45,200	42,200	34,600	31,900	35,800	38,300
28	49,300	49,100	44,000	48,300	42,300	41,900	47,500	42,300	34,800	32,200	37,000	41,600
29	49,200		45,200	37,300	41,700	42,000	31,300	48,700	34,300	33,800	31,100	41,700
30	49,100		48,800	40,200	48,100	41,800	45,700	48,800	36,100	31,600	35,500	41,800
31	49,100		41,000		45,100		42,000	35,900		35,200		41,700
Total	1,489,500	1,324,300	1,444,900	1,350,700	1,338,300	1,284,100	1,379,900	1,333,300	1,290,500	1,049,800	1,039,600	1,174,300
Average	48,048	47,296	46,610	45,023	43,171	42,803	44,513	43,010	43,017	33,865	34,653	37,881
Min	40,600	41,800	40,200	37,300	33,800	37,600	31,300	35,900	34,300	31,400	30,200	32,000
Max	51,200	49,400	49,900	49,400	49,300	49,200	49,600	48,800	49,800	36,400	41,200	44,000

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

**Yearly Average**            **42,491**  
**Yearly Min**                **30,200**  
**Yearly Max**                **51,200**





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

King St. Water Treatment Plant - Peak (Treated) Flows 2018  
m<sup>3</sup>

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	50,960	51,230	52,270	49,480	50,630	48,860	43,130	42,930	43,840	53,200	55,180	52,490
2	66,860	51,300	52,130	42,930	47,700	43,120	51,420	48,380	43,240	50,180	45,290	51,510
3	51,130	50,970	50,660	50,800	42,680	43,260	51,030	50,740	51,340	57,510	33,540	35,460
4	50,710	51,620	51,770	51,490	50,860	43,340	65,510	60,400	51,470	54,880	56,740	35,450
5	50,520	51,360	51,500	51,510	49,300	43,510	64,300	50,500	51,380	54,240	54,650	56,160
6	50,970	51,370	51,350	51,150	43,080	43,210	49,090	43,350	50,830	41,940	44,470	55,050
7	51,690	63,200	43,090	50,680	51,370	43,200	43,270	43,160	50,090	34,340	56,430	51,900
8	51,050	51,520	44,920	42,720	50,000	43,400	50,870	50,470	51,800	39,360	33,890	35,370
9	51,320	51,210	51,860	63,560	51,170	43,270	51,600	50,910	51,590	46,230	37,480	35,990
10	51,200	51,310	51,690	62,680	42,590	43,280	51,350	51,000	43,100	46,610	56,260	54,530
11	51,550	51,250	51,110	51,630	42,700	50,690	43,470	43,230	43,160	48,830	36,150	55,240
12	61,840	51,630	42,940	51,210	42,830	51,680	52,140	42,920	55,260	54,830	57,890	50,400
13	63,800	51,570	51,540	42,900	42,560	50,660	51,110	43,240	51,690	53,710	34,870	53,290
14	51,730	51,500	51,570	51,530	43,140	43,380	43,240	43,080	51,280	54,490	56,600	58,710
15	62,390	51,120	51,570	51,750	43,670	43,260	43,410	49,680	50,290	53,070	57,100	46,540
16	62,050	50,990	51,730	42,750	47,780	43,290	51,860	49,780	51,490	56,420	53,360	46,080
17	61,390	50,780	51,530	48,970	43,460	43,290	51,820	43,010	51,810	55,970	57,740	45,060
18	51,320	48,420	51,040	51,230	50,870	51,600	51,970	43,000	51,580	55,970	55,560	42,900
19	51,420	43,060	52,110	51,490	50,940	51,650	56,980	42,940	48,450	55,340	35,000	49,010
20	51,540	51,320	51,500	43,750	49,390	47,470	50,770	42,970	51,130	44,610	55,530	58,000
21	51,760	50,880	51,390	51,460	51,060	43,000	51,220	42,890	50,390	56,080	45,630	42,890
22	50,790	51,400	48,200	51,500	43,680	43,460	49,750	55,460	43,340	57,130	45,520	42,810
23	51,280	50,500	50,840	51,120	43,590	43,200	43,380	51,410	51,230	57,950	45,100	42,940
24	50,930	43,170	51,260	43,610	51,460	43,230	42,880	50,730	51,660	58,620	45,660	42,980
25	51,200	42,730	52,060	54,270	51,350	43,190	56,170	43,180	53,530	48,160	45,130	42,710
26	50,450	50,990	52,020	49,810	51,370	51,760	43,100	43,180	48,910	55,240	44,090	42,860
27	50,640	51,190	52,000	51,510	49,240	51,800	50,250	43,120	48,720	34,070	44,690	47,470
28	50,740	51,760	60,660	51,590	43,370	43,850	50,110	43,560	47,450	34,710	59,920	42,930
29	50,870		50,780	45,160	46,380	42,960	41,390	51,120	55,500	56,330	45,170	42,900
30	51,320		50,720	42,880	51,830	43,180	50,570	51,190	56,650	33,610	43,940	43,110
31	51,030		49,960		51,420		42,880	43,170		57,111		42,650

Total  
Average  
Min  
Max

66,860	63,200	60,660	63,560	51,830	51,800	65,510	60,400	56,650	58,620	59,920	58,710
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CoA Amount **118,000 m<sup>3</sup>/day**

Yearly Max

**66,860**



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

King St. Water Treatment Plant - Net to Distribution System 2018  
m<sup>3</sup>

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	40,335	48,295	48,047	42,702	43,901	43,922	43,238	44,192	42,762	35,537	33,306	37,773
2	49,438	49,504	47,723	46,359	42,815	44,757	44,761	42,149	42,221	34,236	37,296	35,046
3	49,080	45,944	46,368	46,018	42,985	42,234	46,810	44,032	46,356	35,183	31,992	34,200
4	47,489	46,520	47,994	48,784	43,963	41,385	47,668	45,455	47,678	33,839	35,912	33,821
5	45,686	48,577	46,899	46,686	42,746	43,671	49,521	45,049	50,028	35,175	33,420	34,036
6	46,834	48,890	48,701	48,294	42,429	41,424	45,472	44,665	47,724	31,320	37,577	35,430
7	47,369	46,981	44,200	45,273	42,635	44,824	45,148	42,498	44,353	33,858	34,351	33,744
8	49,046	50,709	44,836	46,107	41,046	42,592	44,134	42,941	46,474	31,128	33,881	33,678
9	50,645	48,257	47,055	46,934	45,898	41,988	47,193	44,351	44,227	36,330	33,233	32,095
10	48,240	48,204	46,319	47,731	44,269	42,737	45,849	43,849	44,571	32,276	33,283	37,554
11	49,664	48,462	45,803	46,070	43,245	44,878	44,394	42,098	42,950	35,976	33,367	34,857
12	48,206	50,020	45,154	47,537	39,620	44,801	47,940	43,992	45,525	33,955	33,445	35,600
13	49,736	51,226	45,868	43,860	41,521	43,187	46,213	45,173	46,065	34,680	33,876	34,258
14	49,618	48,999	47,240	44,062	43,621	41,032	43,632	41,872	46,172	33,248	32,825	40,706
15	49,981	50,075	47,712	45,520	43,253	41,464	45,805	43,034	44,405	37,131	33,712	39,733
16	47,872	47,855	48,286	45,749	42,839	41,821	47,420	43,525	47,970	32,734	34,642	35,208
17	48,497	45,294	47,257	43,773	42,951	42,610	46,406	42,602	47,256	35,397	35,321	37,942
18	49,829	45,260	47,857	47,729	44,350	43,779	45,303	41,316	46,239	33,067	35,064	41,402
19	47,748	44,908	48,785	44,806	39,544	44,286	43,971	42,351	44,006	35,627	35,897	41,245
20	48,358	47,306	45,696	45,316	41,399	43,652	43,755	43,312	42,338	31,991	31,526	44,808
21	49,922	44,340	48,964	44,527	42,044	43,126	46,710	42,358	46,054	33,921	35,873	40,323
22	46,975	46,912	45,705	44,819	44,904	44,669	42,150	39,995	42,657	32,882	33,894	42,357
23	49,808	44,150	45,733	44,007	43,565	41,363	44,371	42,666	45,053	36,160	38,815	39,315
24	48,125	46,226	46,861	46,098	45,249	42,953	41,592	43,291	43,551	34,027	34,020	40,641
25	49,115	44,516	49,128	45,291	43,304	43,165	43,392	41,843	36,547	34,165	38,075	37,338
26	46,930	47,132	47,928	42,685	45,742	44,187	43,012	41,993	34,103	31,662	33,102	38,312
27	45,881	47,709	49,857	44,715	42,774	44,433	43,974	44,207	33,639	33,232	36,323	39,002
28	48,373	48,934	46,776	43,318	45,367	42,609	42,975	43,910	35,111	31,756	33,555	39,924
29	48,703		47,413	42,454	45,178	43,802	37,203	45,937	34,890	35,609	33,054	41,256
30	49,193		44,408	42,817	45,072	43,244	44,693	44,196	34,609	32,600	36,540	41,065
31	49,590		44,120		42,742		43,610	43,161		35,048		42,475
Total	1,496,284	1,331,203	1,454,692	1,360,041	1,340,970	1,294,594	1,388,314	1,342,012	1,295,531	1,053,749	1,037,175	1,175,141
Average	48,267	47,543	46,926	45,335	43,257	43,153	44,784	43,291	43,184	33,992	34,573	37,908
Min	40,335	44,150	44,120	42,454	39,544	41,032	37,203	39,995	33,639	31,128	31,526	32,095
Max	50,645	51,226	49,857	48,784	45,898	44,878	49,521	45,937	50,028	37,131	38,815	44,808
					<b>Yearly Average</b>		<b>42,684</b>					
					<b>Yearly Min</b>		<b>31,128</b>					
					<b>Yearly Max</b>		<b>51,226</b>					



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

Kingston Central Water Treatment Plant - City East Flows 2018  
m<sup>3</sup>

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	5,290	6,997	6,574	6,688	8,223	8,031	7,680	7,965	6,647	6,738	4,801	6,753
2	7,513	9,315	4,910	9,047	7,588	8,047	7,778	6,058	5,200	5,142	7,267	6,749
3	7,509	8,089	8,346	7,079	6,709	7,882	8,533	7,696	6,999	6,083	3,912	5,896
4	6,905	8,357	8,246	9,648	8,181	6,100	8,798	7,717	7,292	5,010	7,631	7,213
5	6,215	7,778	7,785	7,560	8,338	7,446	10,758	7,488	7,289	7,461	4,915	6,337
6	7,699	8,647	8,597	9,233	6,940	6,466	8,872	6,356	7,833	5,258	6,360	7,690
7	7,838	6,892	7,321	7,244	7,105	8,344	8,336	6,506	5,683	6,311	5,864	5,716
8	7,715	9,437	7,633	9,179	6,691	6,579	8,200	5,465	7,791	4,781	6,445	7,258
9	7,061	7,308	8,461	8,441	8,617	7,496	8,579	6,755	4,576	7,123	5,837	5,797
10	6,853	9,113	6,892	8,602	7,418	7,589	8,391	7,061	7,141	3,915	5,635	7,245
11	8,698	6,973	8,859	7,102	7,510	8,046	7,973	6,557	5,001	7,523	6,150	6,149
12	6,650	8,618	8,072	9,793	7,053	7,871	9,175	6,843	7,058	5,041	5,747	7,522
13	9,729	8,118	7,945	6,622	8,064	5,691	8,673	7,968	5,395	7,295	7,006	6,291
14	7,355	8,069	9,196	9,170	7,528	6,732	8,242	5,245	6,961	4,440	5,535	6,619
15	8,540	9,168	7,993	8,620	8,083	7,536	8,682	7,302	6,889	7,463	6,265	6,907
16	6,640	7,979	8,700	9,213	6,949	6,824	8,967	4,676	7,113	4,461	6,209	6,697
17	8,152	7,215	7,168	7,040	7,199	7,932	8,353	6,961	7,817	6,877	6,653	6,401
18	8,271	8,780	8,776	9,114	8,453	7,391	7,944	5,766	6,122	4,968	5,625	7,279
19	6,537	7,694	8,691	6,851	5,401	7,969	9,131	6,951	6,550	7,242	8,194	5,299
20	8,998	9,490	6,033	8,849	8,750	8,041	7,878	5,554	4,836	5,635	5,181	7,459
21	8,415	9,491	9,031	8,580	5,672	8,064	7,760	7,012	7,752	6,693	7,637	5,344
22	6,592	6,645	7,423	7,929	8,284	7,775	5,063	4,574	5,307	5,582	5,213	7,050
23	8,655	6,730	8,646	7,342	6,724	6,785	8,106	7,053	6,229	6,701	7,816	5,856
24	6,578	9,001	7,012	8,217	8,094	7,057	6,366	5,624	5,648	4,956	5,939	5,692
25	8,679	6,709	9,011	9,276	7,732	7,568	7,393	6,463	6,064	6,319	7,785	5,293
26	6,670	8,423	7,617	6,687	7,705	8,105	5,845	5,905	4,854	5,706	5,626	6,561
27	8,204	7,340	9,531	8,183	6,300	7,103	7,041	6,189	6,028	6,279	8,199	6,879
28	7,945	9,520	7,914	6,939	8,156	5,290	7,061	6,382	5,450	5,578	5,334	5,337
29	7,715		9,244	8,650	8,304	8,404	5,940	5,533	5,744	7,615	7,742	7,214
30	8,233		7,815	7,780	7,676	7,724	8,018	6,666	5,060	4,867	5,813	5,290
31	8,032		8,819		7,318		6,926	7,520		7,043		7,514
Total	235,886	227,896	248,259	244,678	232,763	221,886	246,460	201,808	188,328	186,106	188,337	201,305
Average	7,609	8,139	8,008	8,156	7,508	7,396	7,950	6,510	6,278	6,003	6,278	6,494
Min	5,290	6,645	4,910	6,622	5,401	5,290	5,063	4,574	4,576	3,915	3,912	5,290
Max	9,729	9,520	9,531	9,793	8,750	8,404	10,758	7,968	7,833	7,615	8,199	7,690
					<b>Yearly Average</b>		<b>7,194</b>					
					<b>Yearly Min</b>		<b>3,912</b>					
					<b>Yearly Max</b>		<b>10,758</b>					



# Utilities Kingston

## ANNUAL SUMMARY REPORT 2018

### POINT PLEASANT WATER TREATMENT PLANT

WATERWORKS NUMBER: 220001851

#### Reporting Period

January 1, 2018 – December 31, 2018

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



## **ANNUAL SUMMARY REPORT 2018 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 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 Group 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 Underground Infrastructure Department and the Treatment Group 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, contingency plans and operations manuals are established and are located in the appropriate facilities and available to appropriate staff. A quality management system (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.

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 Safe Drinking Water act, 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 2018. The serviced population for the King Street WTP and Point Pleasant WTP is 113,382 (population estimate based on growth rates from Census data for 2014). The annual average daily use was 17,955 cubic meters per day from the Point Pleasant WTP and 42,491 cubic meters per day from the King Street WTP for the year of 2018. Total average per capita use was calculated at 402 litres per person/day. The metered residential use for 2018 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 2018.

## **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 2.80 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 7 - 9 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.

### 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 2018  
m<sup>3</sup>

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	18,187	13,511	14,299	14,767	15,532	18,405	17,606	18,826	17,400	23,316	21,613	21,544
2	16,085	14,958	12,936	15,709	14,514	17,432	20,212	21,308	18,158	21,564	20,659	22,778
3	16,227	17,510	16,455	14,583	14,480	18,849	20,612	19,302	17,241	22,587	21,930	23,243
4	15,672	18,633	16,050	12,779	14,231	15,789	23,453	20,988	17,485	23,207	27,070	24,533
5	15,453	12,586	14,270	16,005	17,057	15,237	21,270	16,800	16,919	22,177	20,670	23,562
6	16,431	15,629	13,672	11,622	17,661	15,601	22,887	18,461	17,812	24,142	18,676	23,808
7	18,221	14,337	15,613	15,305	15,922	15,944	22,894	17,539	21,432	20,506	22,867	25,926
8	15,750	13,812	15,936	16,146	18,116	19,265	23,501	16,161	15,555	24,040	21,218	25,860
9	16,186	13,667	15,876	17,395	15,950	19,985	21,826	15,162	14,552	22,438	22,585	27,193
10	18,428	15,502	14,216	12,460	14,388	20,815	23,033	17,361	14,962	24,823	24,050	21,252
11	16,648	15,732	14,842	13,532	16,996	21,111	20,309	17,956	16,025	23,488	22,959	24,426
12	19,223	14,226	15,940	13,603	20,169	18,456	22,497	19,268	15,965	22,024	25,415	25,489
13	19,915	13,966	14,724	14,262	19,815	18,566	22,361	17,561	16,818	24,746	23,426	24,720
14	17,377	14,306	14,069	17,633	17,207	17,399	20,560	16,978	17,251	22,278	24,744	23,591
15	16,536	14,351	14,661	13,512	15,503	20,395	22,783	17,037	17,977	22,753	23,202	18,386
16	15,416	14,396	12,877	16,201	15,549	18,438	23,711	13,866	16,985	22,111	21,946	23,601
17	16,790	16,135	14,635	15,275	17,235	21,621	21,571	17,376	17,749	22,144	21,795	19,472
18	16,240	15,490	16,202	13,392	16,761	16,120	23,163	16,142	16,624	23,548	23,317	17,913
19	15,966	14,503	16,169	16,502	17,424	18,645	23,738	15,903	19,273	21,961	23,717	16,447
20	19,804	15,101	14,046	11,932	16,868	19,124	26,094	14,967	16,542	25,844	24,289	17,179
21	16,973	13,521	13,397	17,154	15,897	21,762	18,805	16,857	14,475	25,834	23,481	14,670
22	16,173	15,392	15,257	17,058	15,084	16,436	17,224	15,147	15,118	23,898	23,762	13,672
23	15,732	14,707	17,761	17,399	14,979	17,470	19,039	17,958	15,026	20,172	21,066	18,189
24	16,101	13,886	14,837	14,249	17,669	17,795	18,769	16,469	14,426	21,574	23,920	17,166
25	17,390	16,380	15,450	16,259	18,012	18,572	16,251	15,938	20,962	23,019	21,288	13,044
26	14,984	16,980	14,291	16,114	17,680	20,218	17,924	17,217	24,187	23,327	25,597	16,130
27	18,406	13,819	13,354	14,485	21,057	15,032	18,950	16,787	27,147	22,067	22,233	18,911
28	17,848	13,433	14,543	15,513	17,045	15,222	18,814	15,422	20,560	25,329	23,160	14,831
29	14,859		15,472	16,544	20,686	20,761	21,442	15,251	23,445	22,714	25,290	15,475
30	14,542		15,345	17,726	22,532	20,568	18,884	15,535	22,381	22,225	22,005	14,551
31	13,212		15,914		22,204		17,716	16,034		20,852		14,896
Total	516,775	416,469	463,109	455,116	534,223	551,033	647,899	527,577	540,452	710,708	687,950	622,458
Average	16,670	14,874	14,939	15,171	17,233	18,368	20,900	17,019	18,015	22,926	22,932	20,079
Min	13,212	12,586	12,877	11,622	14,231	15,032	16,251	13,866	14,426	20,172	18,676	13,044
Max	19,915	18,633	17,761	17,726	22,532	21,762	26,094	21,308	27,147	25,844	27,070	27,193

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

**Yearly Average**                      **18,260**  
**Yearly Min**                              **11,622**  
**Yearly Max**                              **27,193**



Point Pleasant Water Treatment Plant - Treated Water Flows 2018  
m<sup>3</sup>

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	17,649	13,554	14,067	15,169	14,995	18,204	17,324	17,984	17,091	22,696	21,473	22,125
2	16,197	15,192	13,250	15,019	14,424	17,410	20,748	20,948	17,608	21,191	20,760	23,359
3	16,270	17,831	15,602	14,627	14,559	18,689	20,399	18,809	16,859	21,570	21,581	23,823
4	14,879	18,311	16,228	12,855	13,922	15,961	22,771	20,359	16,728	22,474	26,693	25,113
5	15,769	13,125	14,138	15,202	16,976	14,738	20,706	16,598	16,734	22,048	20,754	24,143
6	16,760	15,763	13,947	12,011	17,284	15,828	22,339	18,228	16,830	23,720	18,187	23,231
7	18,769	14,666	15,035	14,841	15,611	15,809	22,339	16,924	17,050	20,272	22,170	25,256
8	15,874	14,186	15,824	15,949	17,696	18,758	23,169	15,419	14,755	23,651	21,382	25,279
9	16,713	13,877	15,361	17,001	15,619	20,041	21,701	14,292	13,806	22,264	22,574	26,453
10	18,119	15,845	13,782	12,298	13,774	20,601	22,263	16,574	14,569	24,326	23,775	21,188
11	16,362	15,811	14,887	13,306	17,006	20,524	19,846	17,318	14,828	22,722	22,394	23,747
12	19,387	14,618	15,627	13,607	19,651	18,514	21,921	18,641	14,982	22,029	25,545	24,762
13	20,186	14,205	14,372	13,891	19,661	18,402	21,594	17,322	16,132	24,540	22,918	24,263
14	16,426	14,701	14,663	17,556	16,277	17,198	20,438	17,089	16,482	21,946	24,059	23,016
15	15,906	14,357	14,501	13,410	15,191	19,761	22,385	16,701	17,135	22,265	22,696	17,861
16	15,718	14,288	13,001	15,443	15,488	18,834	23,026	13,534	16,641	22,162	21,394	23,518
17	16,949	15,780	14,872	15,435	16,846	21,221	21,526	17,670	17,080	21,960	21,928	19,539
18	16,040	15,132	16,555	13,203	17,158	16,006	22,204	15,784	16,271	23,636	22,585	17,328
19	16,104	14,535	15,847	16,548	16,706	18,143	23,072	15,660	18,493	21,218	23,422	16,446
20	19,782	14,908	13,447	12,027	17,016	19,293	25,503	14,590	16,556	25,614	23,887	16,613
21	16,775	13,836	13,447	17,040	16,162	21,152	18,318	16,805	13,491	25,735	22,835	14,388
22	16,193	14,356	15,315	16,775	14,677	16,575	17,238	15,179	14,266	23,515	22,820	13,023
23	15,301	14,808	18,069	17,055	15,155	17,292	18,320	17,424	15,247	19,768	20,696	18,247
24	15,870	13,738	14,422	14,144	17,374	17,517	18,459	16,070	14,324	21,546	23,365	16,407
25	16,896	16,286	15,517	16,220	18,234	18,834	16,114	15,725	20,380	22,598	21,331	12,845
26	15,137	16,990	13,931	16,309	17,535	19,641	17,583	16,610	24,019	22,818	24,922	16,386
27	17,951	13,477	13,460	14,274	21,165	14,797	18,934	16,367	26,255	21,936	21,734	19,054
28	17,599	13,491	14,590	15,262	16,887	15,181	18,407	15,384	20,106	24,765	22,172	14,218
29	14,603		15,316	16,273	20,760	20,143	21,062	14,875	22,547	22,252	24,531	15,203
30	14,535		15,464	17,471	22,397	20,745	18,521	15,201	22,101	22,210	22,586	14,176
31	13,586		15,495		21,547		17,507	15,661		20,806		14,724
Total	514,305	417,667	460,032	450,221	527,753	545,812	635,737	515,745	519,366	700,253	677,169	615,734
Average	16,590	14,917	14,840	15,007	17,024	18,194	20,508	16,637	17,312	22,589	22,572	19,862
Min	13,586	13,125	13,001	12,011	13,774	14,738	16,114	13,534	13,491	19,768	18,187	12,845
Max	20,186	18,311	18,069	17,556	22,397	21,221	25,503	20,948	26,255	25,735	26,693	26,453

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

**Yearly Average**                      **18,004**  
**Yearly Min**                              **12,011**  
**Yearly Max**                              **26,693**





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Point Pleasant Water Treatment Plant - Net to Distribution System 2018  
m<sup>3</sup>

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	15,956	13,425	13,566	14,763	14,250	18,749	13,652	16,282	17,060	12,825	20,676	12,777
2	15,890	14,585	12,942	14,616	14,502	16,321	20,838	20,045	16,442	21,315	20,014	23,531
3	15,432	17,300	16,077	13,249	13,835	18,290	21,313	19,990	16,735	21,199	22,068	24,216
4	14,184	18,330	16,445	12,079	12,148	14,994	21,743	20,036	16,735	22,048	25,934	13,542
5	15,170	10,319	11,812	13,646	16,561	14,282	19,479	15,165	16,735	21,474	20,164	24,172
6	17,149	15,220	13,080	17,552	16,359	15,177	22,218	18,736	16,735	22,794	16,485	22,274
7	29,420	15,445	14,787	19,273	16,606	15,754	22,377	15,663	17,761	19,760	22,129	24,051
8	14,886	10,760	14,730	16,779	17,059	18,787	23,515	14,724	15,484	23,151	21,236	25,795
9	15,976	14,475	14,693	13,438	15,594	18,764	19,355	13,019	13,094	21,033	21,853	25,633
10	16,731	14,876	14,356	11,637	12,892	20,701	24,069	16,520	13,086	23,293	23,248	20,707
11	16,943	17,392	15,474	12,930	16,482	18,779	17,351	17,554	14,067	22,147	23,030	22,210
12	18,824	13,162	13,497	13,023	19,106	18,388	21,641	17,407	14,241	21,326	23,669	25,484
13	19,831	13,753	13,988	13,681	18,723	17,489	20,872	16,263	15,647	24,773	21,792	23,561
14	16,182	12,490	13,877	18,815	16,207	16,288	20,516	16,501	14,369	22,255	23,714	21,357
15	15,407	15,930	13,764	13,209	14,420	19,252	21,493	15,946	17,763	20,205	22,227	18,353
16	14,507	13,977	11,703	12,516	14,725	19,229	23,735	13,802	15,612	22,565	21,048	22,489
17	16,279	15,511	17,281	14,684	16,197	19,466	19,371	16,123	17,589	21,336	22,757	19,168
18	15,452	14,557	15,017	12,107	16,658	15,827	21,750	15,096	15,662	22,019	21,935	16,713
19	14,882	14,610	13,283	15,500	15,873	17,958	22,419	15,986	17,297	21,925	21,387	16,080
20	20,281	14,567	13,588	13,206	16,892	18,460	25,417	14,287	15,748	25,478	24,137	15,489
21	15,680	11,259	13,131	16,706	15,225	20,206	16,859	15,406	13,297	24,691	22,101	13,936
22	15,844	13,869	14,823	17,281	14,135	17,140	16,169	14,544	14,418	21,217	22,491	13,617
23	14,540	14,007	17,040	14,907	15,198	16,421	18,541	17,445	15,273	19,908	20,076	18,103
24	14,749	15,028	14,951	13,883	17,295	16,716	17,876	15,490	12,559	21,428	23,358	13,807
25	15,868	15,948	16,357	15,123	16,814	17,718	15,161	15,719	20,848	21,719	21,213	13,072
26	14,840	16,259	10,652	15,081	16,935	19,490	16,093	16,030	22,738	22,706	23,462	16,470
27	18,446	11,135	12,934	14,530	20,471	15,006	18,685	14,764	24,910	22,141	19,893	17,853
28	17,390	13,435	14,172	15,145	16,729	15,485	17,548	14,038	19,891	23,775	21,562	13,278
29	14,579		14,479	16,470	19,843	18,981	22,485	15,244	22,217	21,038	24,827	15,739
30	12,468		15,394	15,438	21,560	17,539	16,888	14,637	21,918	21,251	20,805	13,550
31	12,430		15,045		20,137		17,154	15,350		20,063		13,661
Total	506,217	401,623	442,937	441,270	509,432	527,657	616,585	497,811	505,928	672,859	659,293	580,690
Average	16,330	14,344	14,288	14,709	16,433	17,589	19,890	16,058	16,864	21,705	21,976	18,732
Min	12,430	10,319	10,652	11,637	12,148	14,282	13,652	13,019	12,559	12,825	16,485	12,777
Max	29,420	18,330	17,281	19,273	21,560	20,701	25,417	20,045	24,910	25,478	25,934	25,795
					<b>Yearly Average</b>		<b>17,410</b>					
					<b>Yearly Min</b>		<b>10,319</b>					
					<b>Yearly Max</b>		<b>29,420</b>					



# Utilities Kingston

## ANNUAL SUMMARY REPORT 2018

### CANA WATER TREATMENT SYSTEM

WATERWORKS NUMBER: 220006053

#### Reporting Period

January 1, 2018 – December 31, 2018

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



**ANNUAL SUMMARY REPORT**  
**2018**  
**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 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 located in the Cana Subdivision, and its associated distribution system serving customers on Marian Crescent, Cana Boulevard and Rochdale Crescent. The groundwater well and its associated distribution system are owned by the City of Kingston, with Utilities Kingston acting as operating authority.

**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 Group 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 Underground Infrastructure Department and the Treatment Group 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, contingency plans and operations manuals are established and are located in the appropriate facilities and available to appropriate staff.

A quality management system (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. 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 Safe Drinking Water Act, 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 are required for any instances where a sample result indicated that a parameter used to measure water quality exceeded a Maximum Acceptable Concentration (MAC). 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.

There were NO incidents regarding any other parameters which required notification during this reporting period.

### **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 2018.

With an annual average daily use of 62.55 m<sup>3</sup>/d (cubic meters per day), the estimated per capita use is 755 litres per day. The per capita use in the distribution system served by this plant is above the typical Canadian average of 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 2018.

### **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 3.20 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.



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Cana Well Supply - Daily Total -Raw Water Flows 2018  
m<sup>3</sup>

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	66.50	56.00	63.00	68.75	63.00	78.33	66.25	57.50	58.20	59.50	52.00	54.67
2	53.00	65.67	65.00	56.00	53.50	78.33	66.25	57.50	58.20	59.50	61.33	54.67
3	49.00	65.67	65.00	56.00	53.50	78.33	64.00	68.60	73.00	53.00	61.33	53.50
4	49.00	65.67	65.00	66.00	73.33	76.00	64.50	68.60	73.00	53.00	61.33	53.50
5	61.00	65.00	74.00	66.00	73.33	76.00	64.50	68.60	42.00	57.25	52.50	53.50
6	61.00	65.00	74.00	66.00	73.33	74.50	66.67	67.00	42.00	57.25	52.50	53.50
7	61.00	66.00	71.00	66.00	70.00	74.50	66.67	57.00	57.67	57.25	51.50	58.67
8	49.50	66.00	71.00	66.00	70.00	71.33	66.67	57.00	57.67	57.25	51.50	58.67
9	49.50	70.00	58.00	61.00	78.00	71.33	72.00	57.00	57.67	52.00	55.67	58.67
10	51.00	70.00	58.00	61.00	78.00	71.33	72.00	67.30	55.50	59.00	55.67	54.00
11	51.00	70.00	58.00	58.00	76.67	56.50	58.50	67.30	55.50	59.00	55.67	54.00
12	51.67	62.00	62.50	58.00	76.67	56.50	58.50	67.30	55.00	56.00	55.00	54.50
13	51.67	62.00	62.50	63.67	76.67	70.50	65.60	59.30	57.25	56.00	55.00	54.50
14	51.67	62.50	57.00	63.67	75.00	70.50	65.50	59.30	57.25	56.00	54.00	50.00
15	62.00	62.50	57.00	63.67	75.00	64.67	65.50	59.30	57.25	56.67	54.00	50.00
16	62.00	66.00	66.00	60.50	72.00	64.67	66.00	54.00	57.25	56.67	55.33	50.00
17	62.00	66.00	66.00	60.50	72.00	64.67	66.00	59.90	53.50	56.67	55.33	51.50
18	51.00	66.00	66.00	63.00	81.75	61.00	59.50	59.30	53.50	53.00	55.33	51.50
19	57.33	66.00	62.50	63.00	81.75	61.00	59.50	59.30	55.50	57.33	52.00	56.50
20	57.33	59.00	62.50	71.67	81.75	62.00	67.60	56.00	55.50	57.33	52.00	56.50
21	57.33	61.00	61.00	71.67	81.75	62.00	67.60	56.00	56.33	57.33	57.50	55.00
22	57.50	61.00	61.00	71.67	64.00	63.67	67.60	56.00	56.33	51.50	57.50	55.00
23	57.50	66.00	69.33	68.50	78.00	63.67	55.60	56.00	56.33	51.50	51.00	55.00
24	50.50	66.00	69.33	68.50	78.00	63.67	55.60	65.00	54.50	52.50	51.00	58.00
25	50.50	66.00	69.33	61.00	80.67	67.00	55.60	65.00	54.50	52.50	51.00	58.00
26	58.00	59.50	67.50	61.00	80.67	67.00	47.00	65.00	56.50	58.00	54.75	58.00
27	58.00	59.50	67.50	64.33	80.67	59.00	65.00	60.50	56.50	58.00	54.75	55.75
28	58.00	63.00	72.00	64.33	86.00	59.00	65.00	60.50	59.67	58.00	54.75	55.75
29	59.50		68.75	64.33	86.00	66.25	65.00	58.20	59.67	52.00	54.75	55.75
30	59.50		68.75	63.00	77.50	66.25	70.00	58.20	59.67	52.00	54.67	55.75
31	56.00		68.75		77.50		70.00	58.20		52.00		62.00
Total	1,730.50	1,799.00	2,027.25	1,916.75	2,326.00	2,019.50	1,985.70	1,885.70	1,702.40	1,725.00	1,640.67	1,706.33
Average	55.82	64.25	65.40	63.89	75.03	67.32	64.05	60.83	56.75	55.65	54.69	55.04
Min	49.00	56.00	57.00	56.00	53.50	56.50	47.00	54.00	42.00	51.50	51.00	50.00
Max	66.50	70.00	74.00	71.67	86.00	78.33	72.00	68.60	73.00	59.50	61.33	62.00
					<b>Yearly Total</b>		<b>22,464.80</b>					
					<b>Yearly Average</b>		<b>61.56</b>					
					<b>Yearly Min</b>		<b>42.00</b>					
					<b>Yearly Max</b>		<b>86.00</b>					
	<b>Maximum flow</b>	<b>108.0</b>	<b>m<sup>3</sup>/d</b>									



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Canal Well Supply - Daily Total - **Treated Water Flows** 2018  
m<sup>3</sup>

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	70.25	60.50	66.50	70.25	61.50	77.67	66.00	57.50	60.40	57.50	54.50	56.00
2	61.00	66.33	68.33	57.00	50.00	77.67	66.00	57.50	60.40	57.50	60.00	56.00
3	54.50	66.33	68.33	57.00	50.00	77.67	63.00	66.00	59.50	54.50	60.00	106.00
4	54.50	66.33	68.33	65.50	69.00	78.00	64.00	66.00	59.50	54.50	60.00	106.00
5	63.67	71.50	76.50	65.50	69.00	78.00	64.00	66.00	56.50	57.75	57.00	52.00
6	63.67	71.50	76.50	64.67	69.00	72.00	68.00	69.00	56.50	57.75	57.00	52.00
7	63.67	69.00	72.50	64.67	68.50	72.00	68.00	60.00	58.33	57.75	52.00	59.67
8	52.00	69.00	72.50	64.67	68.50	68.00	68.00	60.00	58.33	57.75	52.00	59.67
9	52.00	72.67	63.33	59.50	79.00	68.00	71.00	60.00	58.33	50.00	56.67	59.67
10	57.00	72.67	63.33	59.50	79.00	68.00	71.00	67.60	55.00	60.00	56.67	57.00
11	57.00	72.67	63.33	62.00	74.33	57.00	60.50	67.60	55.00	60.00	56.67	57.00
12	55.00	66.00	63.00	62.00	74.33	57.00	60.50	67.60	52.00	55.33	57.00	56.00
13	55.00	66.00	63.00	64.67	74.33	69.50	64.60	59.60	58.25	55.33	57.00	56.00
14	55.00	64.50	62.50	64.67	73.50	69.50	64.60	59.60	58.25	55.33	56.50	51.00
15	65.00	64.50	62.50	64.67	73.50	63.33	64.60	59.60	58.25	57.33	56.50	51.00
16	65.00	69.75	69.67	58.00	72.00	63.33	69.50	53.00	58.25	57.33	55.33	51.00
17	65.00	69.75	69.67	58.00	72.00	63.33	69.50	59.30	54.50	57.33	55.33	52.50
18	60.00	69.75	69.67	62.00	78.75	59.00	60.50	59.30	54.50	58.00	55.33	52.50
19	60.33	69.75	64.50	62.00	78.75	59.00	60.50	59.30	57.50	57.67	55.00	54.00
20	60.33	63.00	64.50	65.33	78.75	61.50	66.30	60.00	57.50	57.67	55.00	54.00
21	60.33	63.00	67.00	65.33	78.75	61.50	66.30	60.00	58.00	57.67	57.00	56.00
22	58.50	63.00	67.00	65.33	71.00	62.00	66.30	57.00	58.00	52.00	57.00	56.00
23	58.50	67.67	72.33	67.50	72.50	62.00	56.30	57.00	58.00	52.00	54.00	56.00
24	50.50	67.67	72.33	67.50	72.50	62.00	56.30	63.00	57.00	53.50	54.00	59.00
25	50.50	67.67	72.33	58.00	81.00	67.50	56.30	63.00	57.00	53.50	54.00	59.00
26	60.33	64.50	70.50	58.00	81.00	67.50	55.00	63.00	55.50	57.67	52.75	59.00
27	60.33	64.50	70.50	58.67	81.00	56.00	66.00	59.00	55.50	57.67	52.75	55.25
28	60.33	66.50	74.00	58.67	82.00	56.00	66.00	59.00	58.33	57.67	52.75	55.25
29	63.50		70.25	58.67	82.00	66.00	66.00	60.40	58.33	54.50	52.75	55.25
30	63.50		70.25	61.50	75.50	66.00	68.00	60.40	58.33	54.50	56.00	55.25
31	60.50		70.25		75.50		68.00	60.40		54.50		62.00
Total	1,836.75	1,886.00	2,125.25	1,870.75	2,266.50	1,986.00	2,000.60	1,896.70	1,720.80	1,741.50	1,668.50	1,827.00
Average	59.25	67.36	68.56	62.36	73.11	66.20	64.54	61.18	57.36	56.18	55.62	58.94
Min	50.50	60.50	62.50	57.00	50.00	56.00	55.00	53.00	52.00	50.00	52.00	51.00
Max	70.25	72.67	76.50	70.25	82.00	78.00	71.00	69.00	60.40	60.00	60.00	106.00
					<b>Yearly Total</b>		<b>22,826.35</b>					
					<b>Yearly Average</b>		<b>62.55</b>					
					<b>Yearly Min</b>		<b>50.00</b>					
					<b>Yearly Max</b>		<b>106.00</b>					
<b>CoA amount</b>		<b>108.0</b>	<b>m<sup>3</sup>/d</b>									





# CATARAQUI BAY WASTEWATER TREATMENT PLANT



## 2018 ANNUAL REPORT

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## REPORT CHECK LIST

Annual report submitted for the Environmental Compliance Approval number 4163-ACPPRK.

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 under taken
- 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 facility was compliant with all concentrations, loadings, sampling and maintenance as required in environmental compliance approval 4163-ACPPRK. A sample for acute lethality collected on June 20, 2018 indicated a high mortality rate for Rainbow trout. SAC was notified and additional sampling was conducted which resulted in no mortality of rainbow trout which indicated the effluent water was of good quality. Additional details can be found in the tables contained in Appendix A.

Average flows through the plant decreased slightly in 2018 showing average flows of 29,009 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 located in the report.

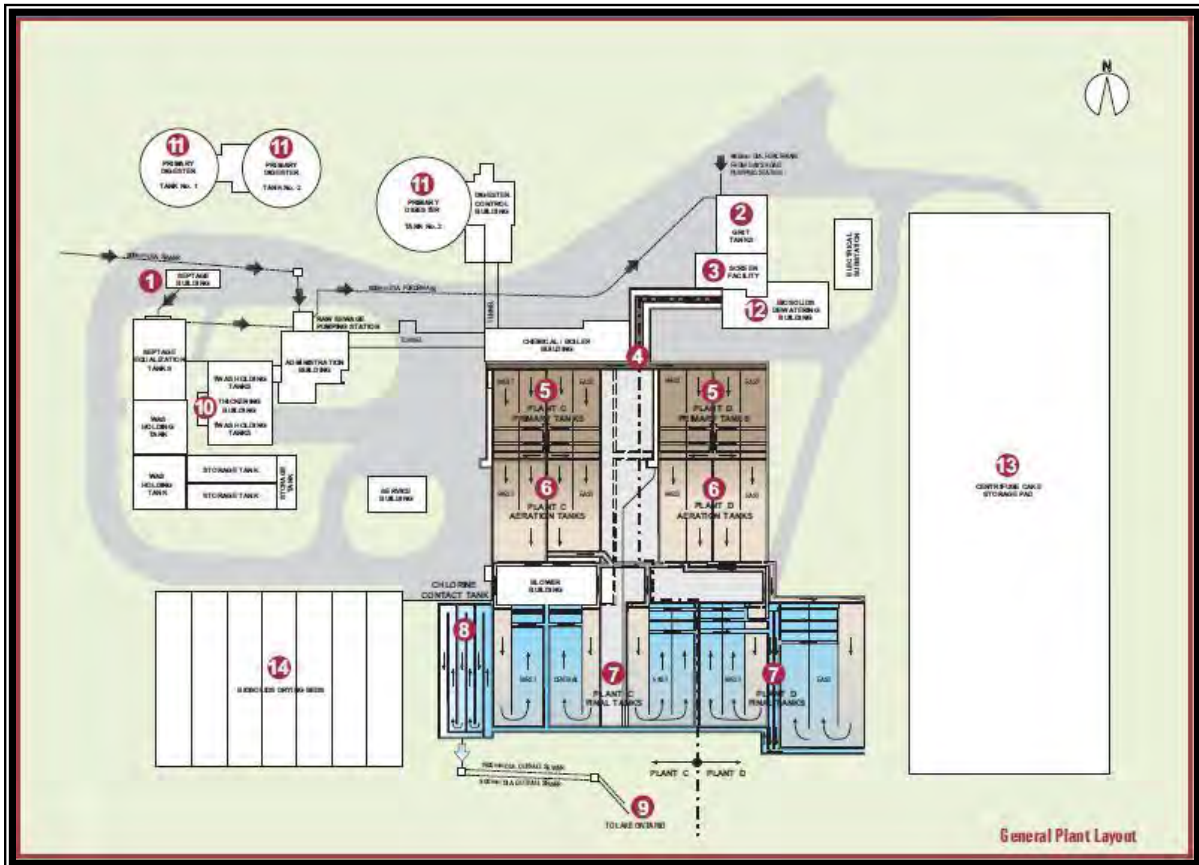
We have continued to provide additional training to staff at the facility to increase their knowledge of the process upgrades currently underway.

The facility saw six secondary bypass events at the Cataraqui Bay Wastewater Treatment Plant and four bypass events within the Kingston West Sewage Collection System in the 2018 reporting year. All by-pass details are listed in Table 7, the Bypass Summary section of this report. All the bypasses except for one (which was due to an unplanned power outage) were due to heavy rainfall events.

Our operation and maintenance staff have continued to assist and support various educational institutions in the area with facility tours, work placements and apprenticeship time.

## PLANT OVERVIEW

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



### Septage Receiving

Septage was received at the Cataraqui Bay wastewater plant via local septic truck haulers up to October of 2016. The septage building was decommissioned in October 2016 to make room for upgrades at Cataraqui Bay Wastewater Treatment Plant. There is now a temporary septage station at Ravensview Wastewater Treatment Plant.

### Grit Removal

The first step in the treatment process is grit removal. This is accomplished by the introduction of air at the bottom of the grit channel. The heavier solids in the wastewater will 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 through 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 micro-organisms. The micro-organisms 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**

The disinfected effluent from the chlorine contact tank after de-chlorinating is discharged back to Lake Ontario through a 1500mm and a 900mm outfall sewer. The diffusers at the ends of the sewer lines are located 25m offshore and 16m 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 through centrifugation. The centrifuged cake produced is land applied when weather and crops permit. Since January 2018, liquid sludge has been hauled from Cataraqui Bay WWTP to Ravensview WWTP for processing due to site construction.

## 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 environmental compliance approval number 3714-9YURZF were compiled during the reporting period of 2018.

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

**Table 1: Effluent Results**

Effluent Objectives		
Effluent Parameter	Objective (mg/l)	2018 Results (avg.)
CBOD <sub>5</sub>	15.0	5 mg/l
Total suspended solids (TSS)	15.0	6 mg/l
Total Phosphorus	1	0.40 mg/l
Total Chlorine Residual	<0.02	0.01 mg/l
E. Coli (Monthly Geometric Mean Density)	200 counts/ 100 ml	32 counts/ 100 ml

**Table 2: Effluent Limits**

Effluent Limits			
Effluent Parameter	Concentration Limit (mg/l)	Loading Limit from effluent (kg/d)	2018 annual average (kg/d)
CBOD <sub>5</sub>	25.0	970	295
Suspended solids (TSS)	25.0	970	181
Total Phosphorus	1.0	39	11.9
Total Chlorine Residual	0.02		0.01

**Table 3: Monthly Effluent Parameters**

<b>Maximum Monthly Comparison of Effluent 2018</b>				
<b>Month</b>	<b>CBOD5 max concen/max loading (mg/L_kg/day)</b>	<b>TSS max concen/max loading (mg/L_kg/day)</b>	<b>TP max concen/max loading (mg/L_kg/day)</b>	<b>E. coli (Monthly geometric mean density)</b>
January	4mg/L_100kg/day	6mg/L_200kg/day	0.49mg/l_17kg/day	10
February	5mg/L-200kg/day	10mg/L_500kg/day	0.47mg/l_133kg/day	140
March	5mg/L-100kg/day	4mg/L_100kg/day	2.55mg/l_97.6kg/day	10
April	8mg/L-300kg/day	11mg/L_610kg/day	0.23mg/l_26kg/day	100
May	12mg/L-370kg/day	70mg/L_2000kg/day	0.60mg/l_22kg/day	393
June	3mg/L-70kg/day	7mg/L_200kg/day	0.65mg/l_15kg/day	6
July	6mg/L-100kg/day	5mg/L_90kg/day	0.61mg/l_17kg/day	6
August	23mg/L-570kg/day	11mg/L_330kg/day	0.49mg/l_17kg/day	30
September	13mg/L-270kg/day	12mg/L_310kg/day	0.69mg/l_17kg/day	10
October	6mg/L-200kg/day	5mg/L_100kg/day	0.64mg/l_15kg/day	96
November	23mg/L-630kg/day	16mg/L_440kg/day	0.84mg/l_30kg/day	44
December	6mg/L-200kg/day	5mg/L_200kg/day	0.44mg/l_15kg/day	16

**Table 4: Annual Plant Flows**

<b>Plant Flows (m<sup>3</sup>/day)</b>							
<b>Parameter</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>
Avg. m <sup>3</sup> /day	25374	26721	27145	26147	26072	30042	28963
Max. m <sup>3</sup> /day	56579	78981	90801	56583	67405	121860	94957
Design. M <sup>3</sup> /day	38800	38800	38800	38800	38800	38800	38800
% (daily/design)	65.4%	68.9%	70.0%	67.4%	67.2%	77.4%	74.6%

**Table 5: Annual Effluent Results**

Final Effluent Parameter Results								
Parameter (mg/L)	2012	2013	2014	2015	2016	2017	2018	LIMITS
CBOD <sub>5</sub>	7.86	19.34	6	5.3	4.05	3.13	5	25
Suspended Solids	5.21	5.53	6.2	6.5	4.8	5.09	6	25
Total Phosphorus	0.53	0.57	0.61	0.55	0.51	0.55	0.40	1.0
Total Chlorine	0.00	0.01	0.01	0.01	0.018	0.018	0.01	<0.02
Acute Lethality	n/a	n/a	n/a	All Pass	All Pass	All Pass	5 Pass/ 1 Fail	Pass

Note: Acute lethality testing was started in 2015.

## MAINTENANCE

In 2018 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.

- Repaired chains and flights for secondary tanks
- Annual infrared scans on HV electrical
- Routine vibration monitoring
- Diesel generator repair & maintenance

## CAPITAL WORKS

In October 2016 work began on plant wide upgrades. During the proposed project completion timeline of 4 years (2016-2020), the Cataraqui Bay Wastewater Treatment Plant will undergo an extensive process, electrical/instrumentation, and mechanical upgrade.

The additional major highlights for capital works in 2018 at the Cataraqui Bay WWTP and associated sewage collection system were:

- Westbrook Pumping Station upgrades and refurbishment
- Environmental Assessment of the Days Rd Pumping Station
- Continued work on the Wastewater Master Plan assessment



## OPERATIONS

Preventative maintenance and regular process and equipment inspections lead to operational problems being diagnosed quickly and corrective actions implemented 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 has implemented 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 two 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 stock piled until land application is available during the summer season.

In January of 2018, the dewatering facility at Cataraqui Bay Sewage Treatment Plant was under construction so liquid sludge was hauled to the Ravensview WWTP for processing. An approximate volume of 29,200m<sup>3</sup> of liquid sludge was transported from Cataraqui Bay Wastewater Treatment Plant to the Ravensview Wastewater Treatment Plant in 2018. With the combination of both Ravensview WWTP and Cataraqui Bay WWTP liquid sludge to process a combined volume of 119,590 m<sup>3</sup> of liquid sludge was processed through the centrifuge, and approximately 14,588 m<sup>3</sup> of sludge cake was stored on site until land applied on licensed agricultural fields. Land application is completed by Smith's Pumping service.

It is too hard to predict exactly where and when we will spread in 2019, as crops and weather will be the major variables that we will be dealing with in the 2019 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 2018**

<u>C Of A and NASM Plan #</u>	<u>Address</u>	<u>Expiry Date</u>
21808	Middle Rd.	31/12/2018
21819	Hamilton Rd.	31/12/2018
21940	SunEdison Property	31/12/2018
22144	McIntyre Rd.	31/12/2019
22243	Multiple Farms (Milligan)	31/12/2019
22281	Haig Rd.	31/12/2019
22383	Brown Rd.	31/12/2020
22685	Multiple Farms	31/12/2020
22694	South Shore Rd.	31/12/2020
22853	Huffman Rd.	31/12/2021
22855	Lake Rd.	31/12/2021
22901	County Rd. 8	31/12/2021
22987	Sunbury Rd.	31/12/2021
23007	County Rd. 4	31/12/2021
23047	Palace Rd.	31/12/2021
23074	Simmons Rd.	31/12/2021
23110	Sunbury Rd.	31/12/2020
23119	Hamilton Rd.	31/12/2021
23215	Sand Hill Rd.	31/12/2021

## **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**

There have been no official complaints about the Cataraqui Bay Wastewater Treatment Plant operations for the reporting year 2018.

## **BYPASS SUMMARIES**

Table 7 summarizes the locations, volumes and durations of bypass events for the reporting year 2018. Table 8 summarizes the test results from samples taken during the 2018 bypass events.

**Table 7: Bypass Events**

<b>Bypass Event Record</b>						
<b>Date mm/dd/yyyy</b>	<b>Location</b>	<b>Start Time</b>	<b>Duration (hr + mins)</b>	<b>Volume (m<sup>3</sup>)</b>	<b>Reason For Bypass</b>	<b>Precip (mm)</b>
<b>01/12/2018 – 01/13/2018</b>	<b>Cataraqi Bay WWTP (secondary bypass)</b>	<b>7:45</b>	<b>3:55</b>	<b>5600</b>	<b>Heavy rain/ rapid snow melt</b>	<b>38.1</b>
<b>01/12/2018</b>	<b>Crerar Pumping Station</b>	<b>6:45</b>	<b>21:30</b>	<b>600</b>	<b>Heavy rain/rapid snow melt</b>	<b>38.1</b>
<b>02/20/2018 – 02/21/2018</b>	<b>Cataraqi Bay WWTP (secondary bypass)</b>	<b>08:00</b>	<b>13:45</b>	<b>5600</b>	<b>Heavy rain/snow melt</b>	<b>26.1</b>
<b>02/20/2018</b>	<b>Crerar Pumping Station</b>	<b>13:55</b>	<b>19:30</b>	<b>100</b>	<b>Heavy rain/snow melt</b>	<b>26.1</b>
<b>04/16/2018 – 04/18/2018</b>	<b>Cataraqi Bay WWTP (secondary bypass)</b>	<b>17:38</b>	<b>10:15</b>	<b>20507</b>	<b>Heavy rain/snow melt</b>	<b>30.3</b>
<b>04/16/2018 – 04/17/2018</b>	<b>Crerar Pumping Station</b>	<b>17:15</b>	<b>2:30</b>	<b>851</b>	<b>Heavy rain/snow melt</b>	<b>30.3</b>
<b>05/29/2018</b>	<b>Cataraqi Bay WWTP (secondary bypass)</b>	<b>17:30</b>	<b>21:30</b>	<b>4333</b>	<b>Unplanned power disruption</b>	
<b>11/27/2018 – 11/28/2018</b>	<b>Cataraqi Bay WWTP (secondary bypass)</b>	<b>4:50</b>	<b>3:10</b>	<b>5002</b>	<b>Heavy rain over short period and runoff</b>	<b>11.5</b>
<b>12/22/2018 – 12/23/2018</b>	<b>Cataraqi Bay WWTP (secondary bypass)</b>	<b>18:45</b>	<b>2:30</b>	<b>6606</b>	<b>Heavy rain</b>	<b>65.7</b>
<b>12/21/2018 – 12/22/2018</b>	<b>Crerar Pumping Station</b>	<b>21:00</b>	<b>5:00</b>	<b>122</b>	<b>Heavy rain</b>	<b>65.7</b>

**Table 8: Bypass Sampling**

<b>Bypass Event Sampling Results Annual Average for Cataraqi Bay Wastewater Treatment Plant</b>		
<b>Parameter</b>	<b>Units</b>	<b>Cat. Bay STP Annual Avg.</b>
E coli	Cfu/100mL	20568
CBOD <sub>5</sub>	mg/l	28
TSS	mg/l	79
TP	mg/l	1.75
<b>Bypass Event Sampling Results Annual Average for Crerar Pumping Station</b>		
<b>Parameter</b>	<b>Units</b>	<b>Crerar PS Annual Avg.</b>
E coli	Cfu/100mL	11468
CBOD <sub>5</sub>	mg/l	10
TSS	mg/l	46
TP	mg/l	0.83

**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**



# CATARAQUI BAY Wastewater Treatment Plant

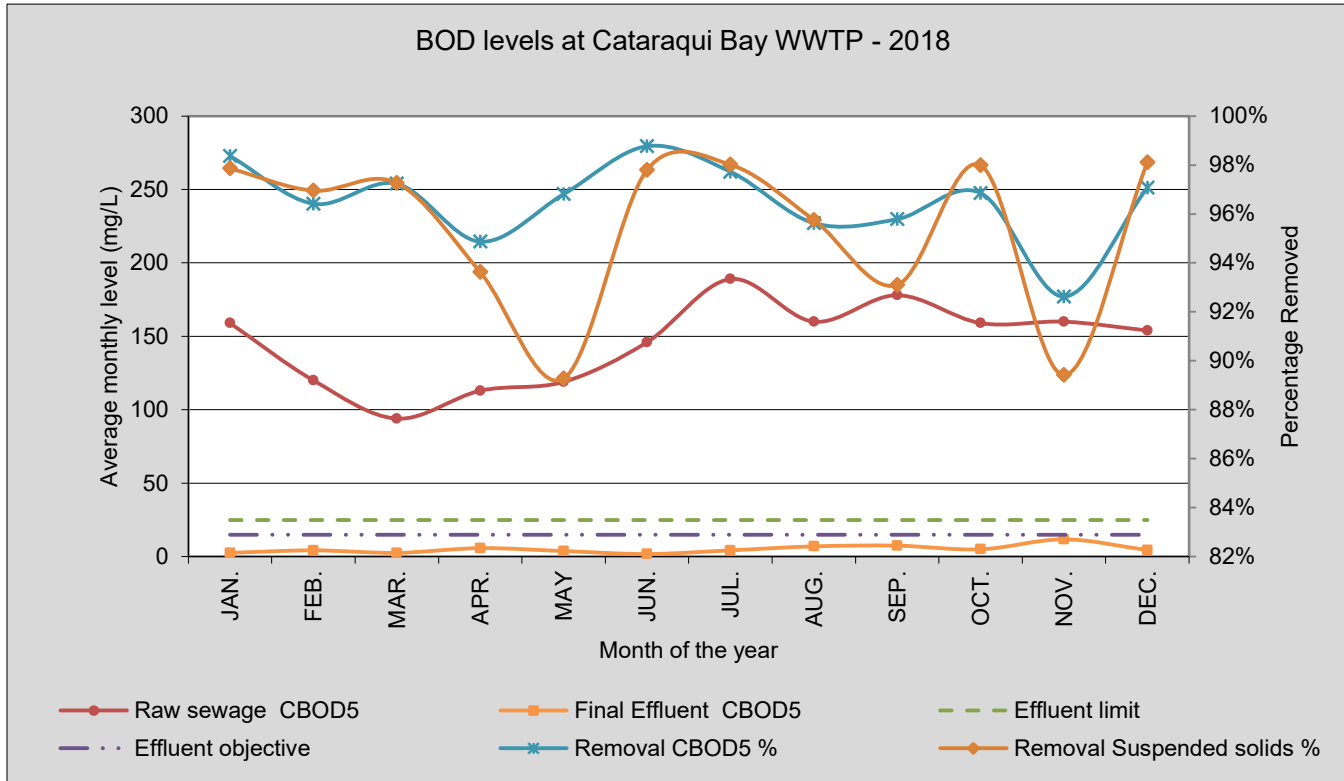
## 2018 ANNUAL REPORT

### Monthly data

Month	Units	Raw sewage	Final Effluent	Removal	Raw sewage	Final Effluent	Removal
		CBOD5 mg/L	CBOD5 mg/L	CBOD5 %	Suspended solids mg/L	Suspended solids mg/L	Suspended solids %
JAN.		159.0	2.6	98%	182.0	3.9	98%
FEB.		120.0	4.3	96%	141.0	4.3	97%
MAR.		94.0	2.6	97%	95.0	2.6	97%
APR.		113.0	5.8	95%	138.0	8.8	94%
MAY		119.0	3.8	97%	138.0	14.8	89%
JUN.		146.0	1.8	99%	218.0	4.8	98%
JUL.		189.0	4.3	98%	151.0	3.0	98%
AUG.		160.0	7.0	96%	132.0	5.6	96%
SEP.		178.0	7.5	96%	100.0	6.9	93%
OCT.		159.0	5.0	97%	149.0	3.0	98%
NOV.		160.0	11.8	93%	104.0	11.0	89%
DEC.		154.0	4.5	97%	159.0	3.0	98%
Average		145.9	5.1	97%	142.3	6.0	96%
Objective			15.0			15.0	
Limit			25.0			25.0	



# CATARAQUI BAY Wastewater Treatment Plant 2018 ANNUAL REPORT Monthly Graphs





# CATARAQUI BAY Wastewater Treatment Plant

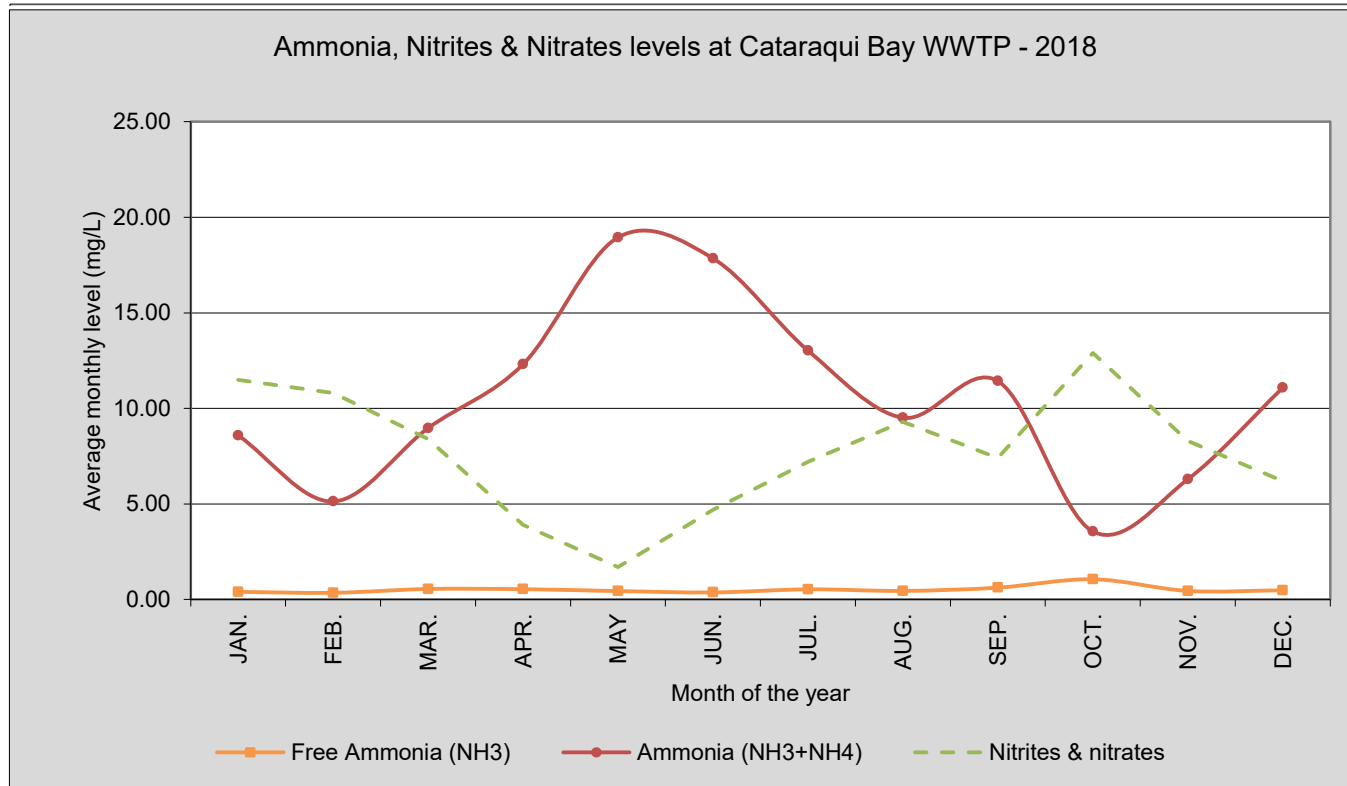
## 2018 ANNUAL REPORT

### Monthly data

Month	Unit	Raw sewage	Final Effluent results	
		Free Ammonia (NH <sub>3</sub> )	Final Effluent Ammonia (NH <sub>3</sub> +NH <sub>4</sub> )	Final Effluent Nitrites & nitrates
		mg/L	mg/L	mg/L
JAN.		0.40	8.59	11.5
FEB.		0.35	5.13	10.8
MAR.		0.55	8.97	8.4
APR.		0.54	12.31	3.9
MAY		0.44	18.95	1.7
JUN.		0.37	17.85	4.7
JUL.		0.53	13.03	7.2
AUG.		0.45	9.51	9.3
SEP.		0.62	11.43	7.4
OCT.		1.06	3.56	12.9
NOV.		0.45	6.29	8.3
DEC.		0.48	11.08	6.2
Average Objective Limit		0.52	10.56 Variable	7.69



# CATARAQUI BAY Wastewater Treatment Plant 2018 ANNUAL REPORT Monthly Graphs





# CATARAQUI BAY Wastewater Treatment Plant

## 2018 ANNUAL REPORT

### Monthly data

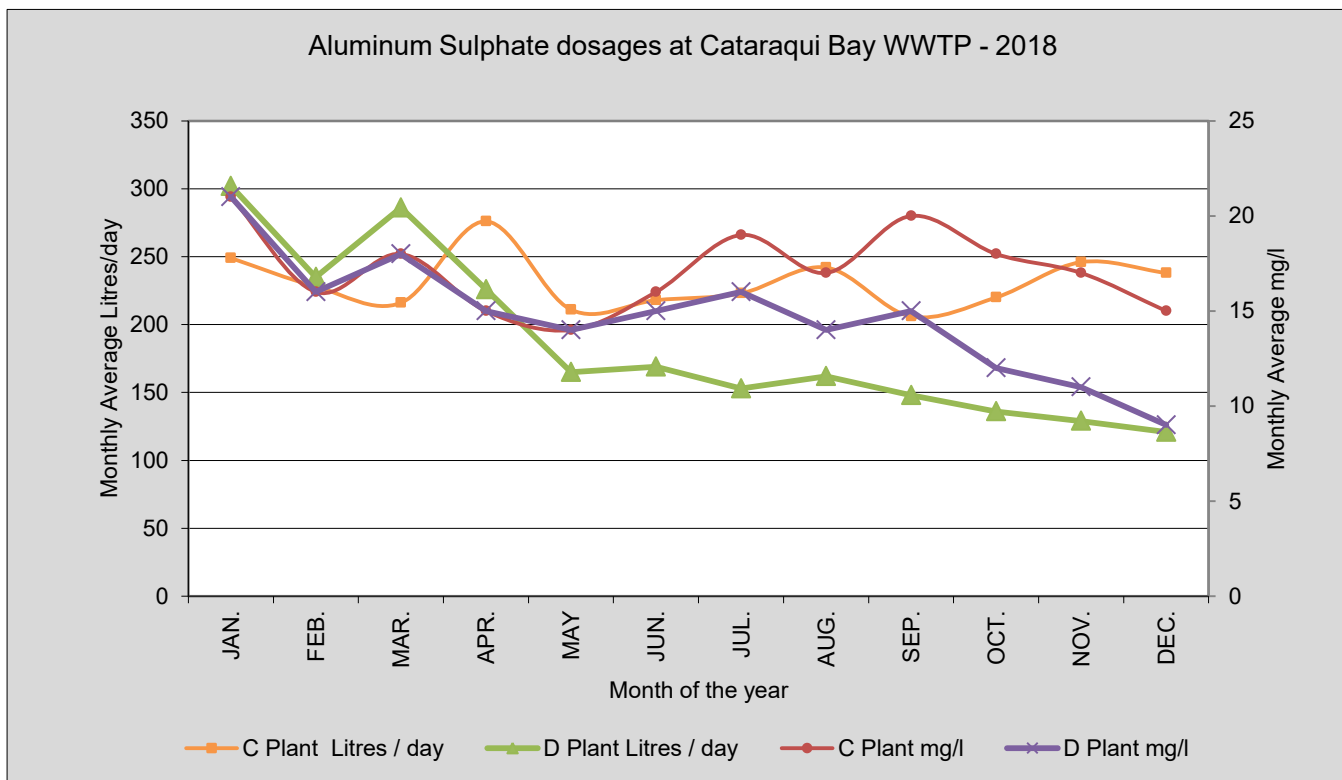
#### Aluminum Sulphate

Month	Unit	C Plant Litres / day	C Plant mg/l	D Plant Litres / day	D Plant mg/l
JAN.		249	21	302	21
FEB.		228	16	235	16
MAR.		216	18	286	18
APR.		276	15	226	15
MAY		211	14	165	14
JUN.		218	16	169	15
JUL.		223	19	153	16
AUG.		242	17	162	14
SEP.		206	20	148	15
OCT.		220	18	136	12
NOV.		246	17	129	11
DEC.		238	15	121	9
Average		231	17	186	15





# CATARAQUI BAY Wastewater Treatment Plant 2018 ANNUAL REPORT Monthly Graphs





# CATARAQUI BAY Wastewater Treatment Plant

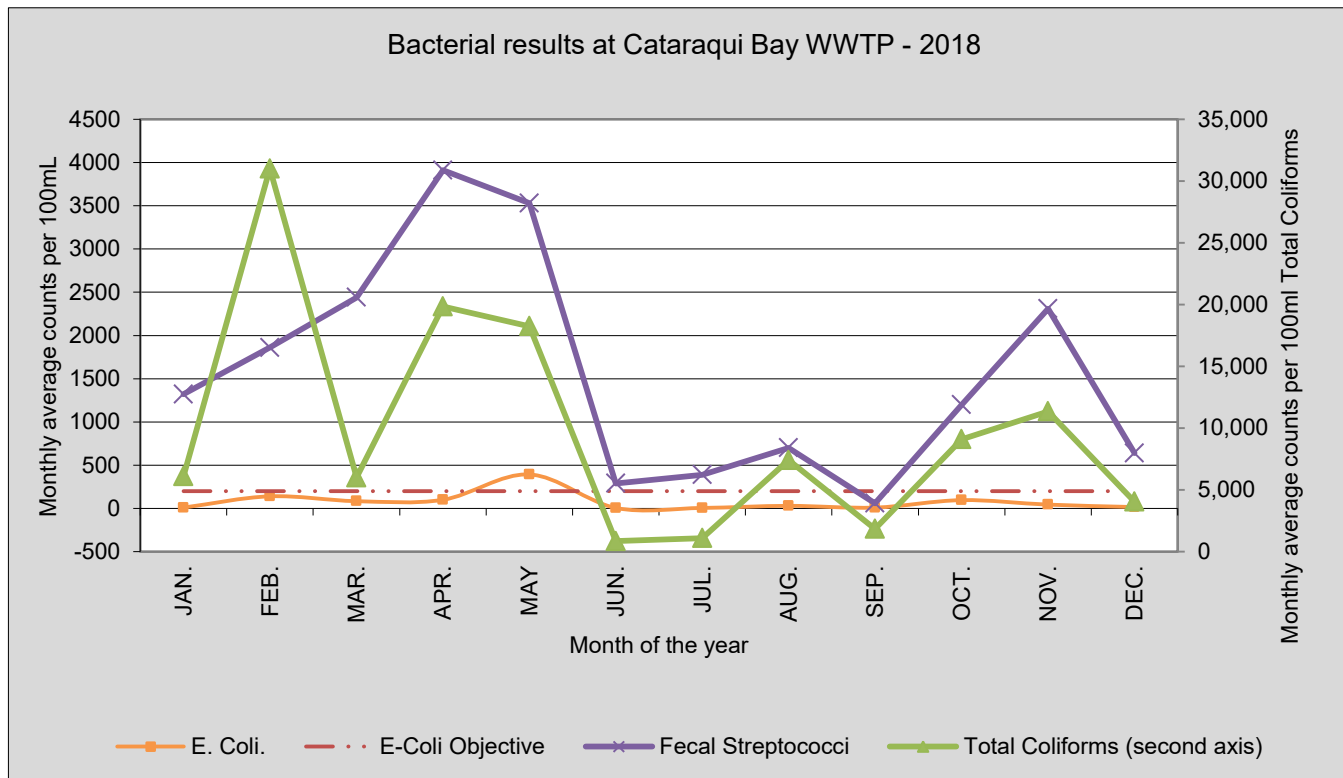
## 2018 ANNUAL REPORT

### Monthly data

Month	Final Effluent		Bacterial results			Final Effluent Acute lethality to trout pass / fail
	Unit	E. Coli. counts / 100mL	E-Coli Objective counts / 100mL	Final Effluent Total Coliforms (second axis) counts / 100mL	Final Effluent Fecal Streptococci counts / 100mL	
JAN.		10	200	6,100	1,320	
FEB.		140	200	31,000	1,860	pass
MAR.		84	200	6,000	2,440	
APR.		100	200	19,850	3,910	
MAY		393	200	18,250	3,530	
JUN.		6	200	850	290	fail
JUL.		6	200	1,100	390	pass
AUG.		30	200	7,400	700	
SEP.		10	200	1,850	60	
OCT.		96	200	9,100	1,200	pass
NOV.		44	200	11,350	2,310	pass
DEC.		16	200	4,050	640	pass
Average		77.92		9,741.67	1,554.17	
Objective		200				



# CATARAQUI BAY Wastewater Treatment Plant 2018 ANNUAL REPORT Monthly Graphs





# CATARAQUI BAY Wastewater Treatment Plant

## 2018 ANNUAL REPORT

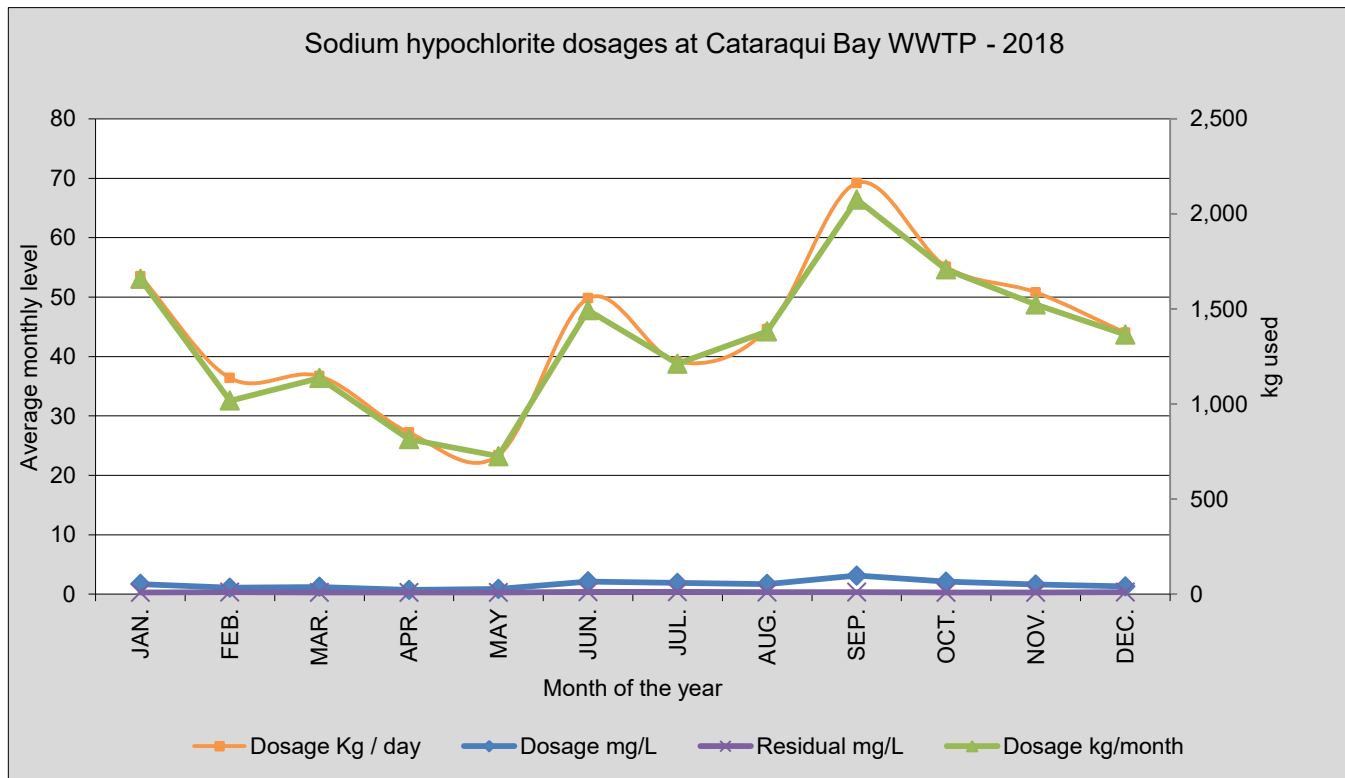
### Monthly data

#### Sodium hypochlorite

Month	Unit	Dosage Kg / day	Dosage kg/month	Dosage mg/L	Residual mg/L
JAN.		54	1,658	1.72	0.30
FEB.		36	1,018	1.09	0.33
MAR.		37	1,137	1.23	0.30
APR.		27	815	0.70	0.31
MAY		23	726	0.88	0.32
JUN.		50	1,493	2.15	0.38
JUL.		39	1,212	1.90	0.38
AUG.		45	1,382	1.72	0.34
SEP.		69	2,075	3.13	0.36
OCT.		55	1,708	2.10	0.31
NOV.		51	1,524	1.63	0.32
DEC.		44	1,365	1.33	0.35
Average		44	1,342.75	1.63	0.33



# CATARAQUI BAY Wastewater Treatment Plant 2018 ANNUAL REPORT Monthly Graphs





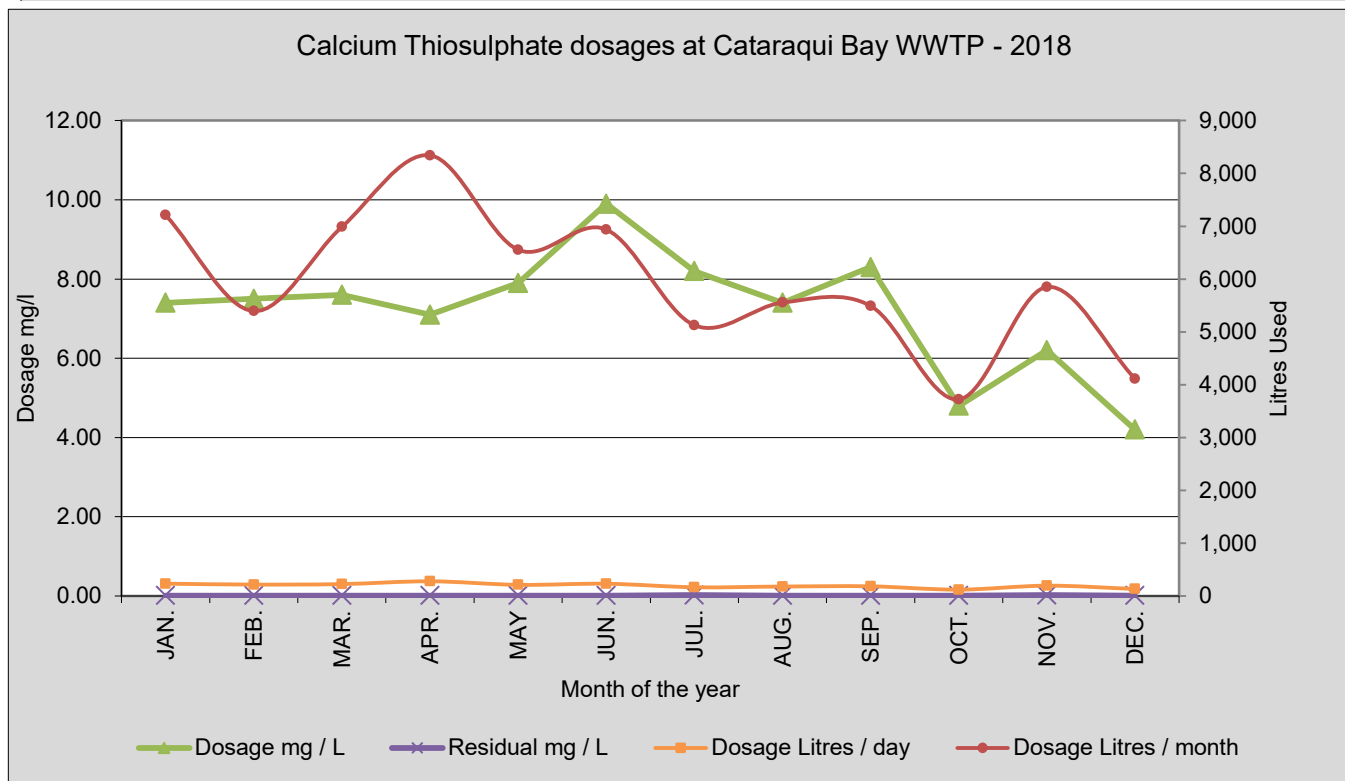
# CATARAQUI BAY Wastewater Treatment Plant 2018 ANNUAL REPORT Monthly data

## Calcium Thiosulphate

Month	Unit	Dosage Litres / day	Dosage Litres / month	Dosage mg / L	Residual mg / L	Compliance Yes / No
JAN.		233	7,211	7.40	0.0	yes
FEB.		216	5,393	7.50	0.0	yes
MAR.		225	6,988	7.60	0.0	yes
APR.		278	8,343	7.10	0.0	yes
MAY		211	6,554	7.90	0.0	yes
JUN.		232	6,938	9.90	0.0	yes
JUL.		165	5,126	8.20	0.0	yes
AUG.		179	5,555	7.40	0.0	yes
SEP.		183	5,491	8.30	0.0	yes
OCT.		120	3,721	4.80	0.0	yes
NOV.		195	5,850	6.20	0.0	yes
DEC.		133	4,113	4.20	0.0	yes
Average		198	5,940	7.21	0.0	



# CATARAQUI BAY Wastewater Treatment Plant 2018 ANNUAL REPORT Monthly Graphs





# CATARAQUI BAY Wastewater Treatment Plant

## 2018 ANNUAL REPORT

### Monthly data

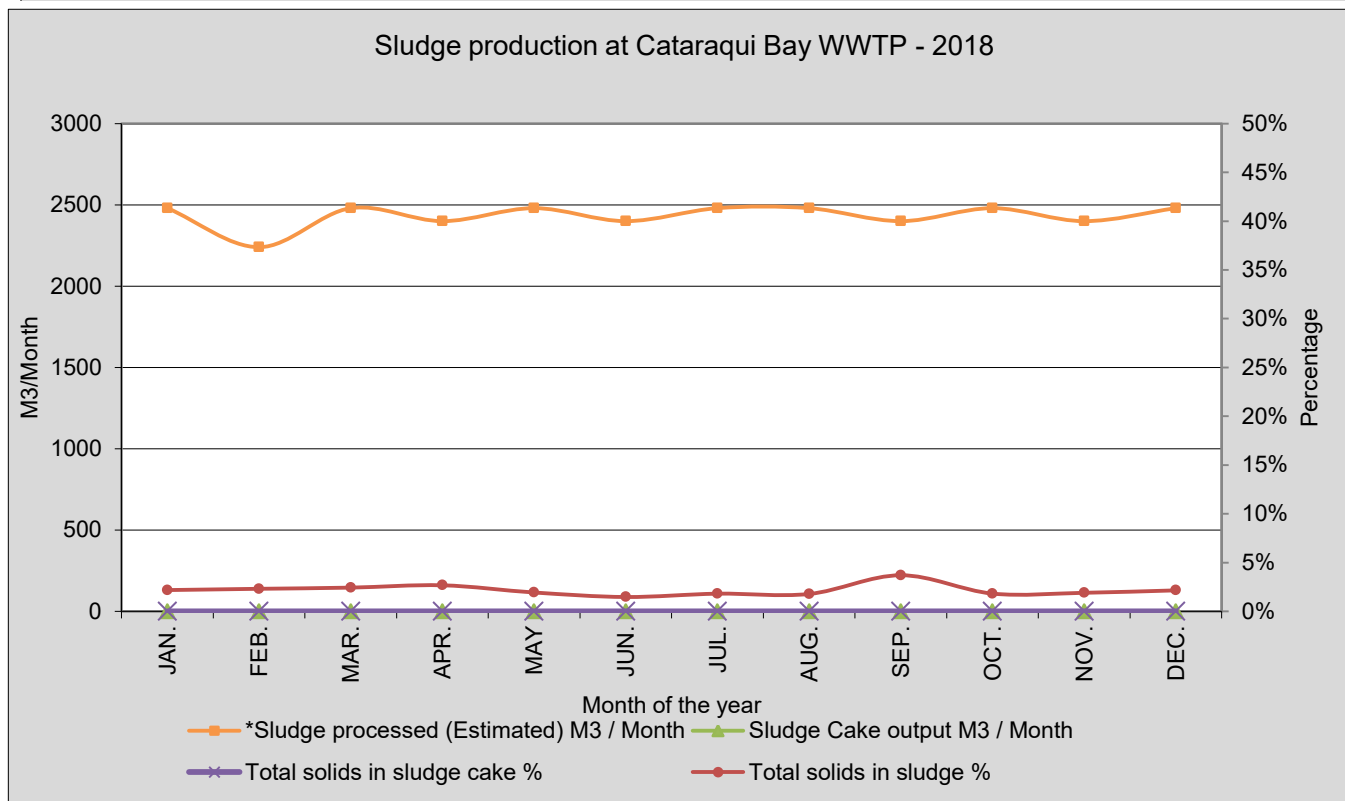
Month	Unit	*Digested sludge *Sludge		*Sludge Cake	
		processed (Estimated) M3 / Month	Total solids in sludge %	Sludge Cake output M3 / Month	Total solids in sludge cake %
JAN.		2480	2.2%	N/A	N/A
FEB.		2240	2.3%	N/A	N/A
MAR.		2480	2.4%	N/A	N/A
APR.		2400	2.7%	N/A	N/A
MAY		2480	1.9%	N/A	N/A
JUN.		2400	1.5%	N/A	N/A
JUL.		2480	1.8%	N/A	N/A
AUG.		2480	1.8%	N/A	N/A
SEP.		2400	3.7%	N/A	N/A
OCT.		2480	1.8%	N/A	N/A
NOV.		2400	1.9%	N/A	N/A
DEC.		2480	2.2%	N/A	N/A
Average		2,433	2.2%		
		29200			

\*Sludge Processed based on hauled sludge estimate of 80 m3/day transported to Ravenview for Sludge Cake Production at that location during construction





# CATARAQUI BAY Wastewater Treatment Plant 2018 ANNUAL REPORT Monthly Graphs





# CATARAQUI BAY Wastewater Treatment Plant

## 2018 ANNUAL REPORT

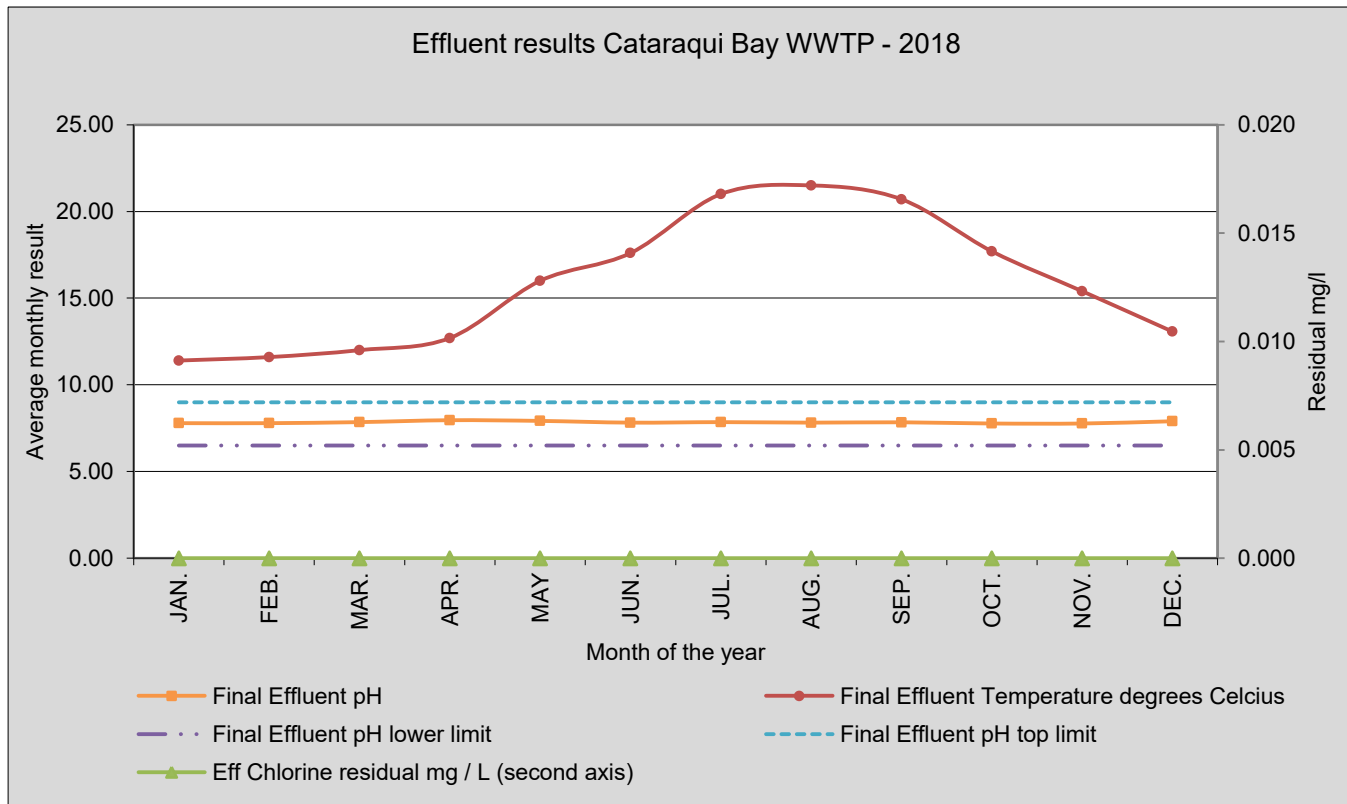
### Monthly data

#### Effluent Summary from daily samples

Month	Final Effluent pH	Final Effluent pH lower limit	Final Effluent pH top limit	Final Effluent Temperature	Eff Chlorine residual
	Unit			degrees Celcius	mg / L (second axis)
JAN.	7.79	6.5	9	11.40	0.0
FEB.	7.79	6.5	9	11.60	0.0
MAR.	7.85	6.5	9	12.00	0.0
APR.	7.96	6.5	9	12.70	0.0
MAY	7.92	6.5	9	16.00	0.0
JUN.	7.82	6.5	9	17.60	0.0
JUL.	7.85	6.5	9	21.00	0.0
AUG.	7.82	6.5	9	21.50	0.0
SEP.	7.84	6.5	9	20.70	0.0
OCT.	7.77	6.5	9	17.70	0.0
NOV.	7.77	6.5	9	15.40	0.0
DEC.	7.90	6.5	9	13.07	0.0
Average	7.8			15.89	0.00



# CATARAQUI BAY Wastewater Treatment Plant 2018 ANNUAL REPORT Monthly Graphs





# CATARAQUI BAY Wastewater Treatment Plant

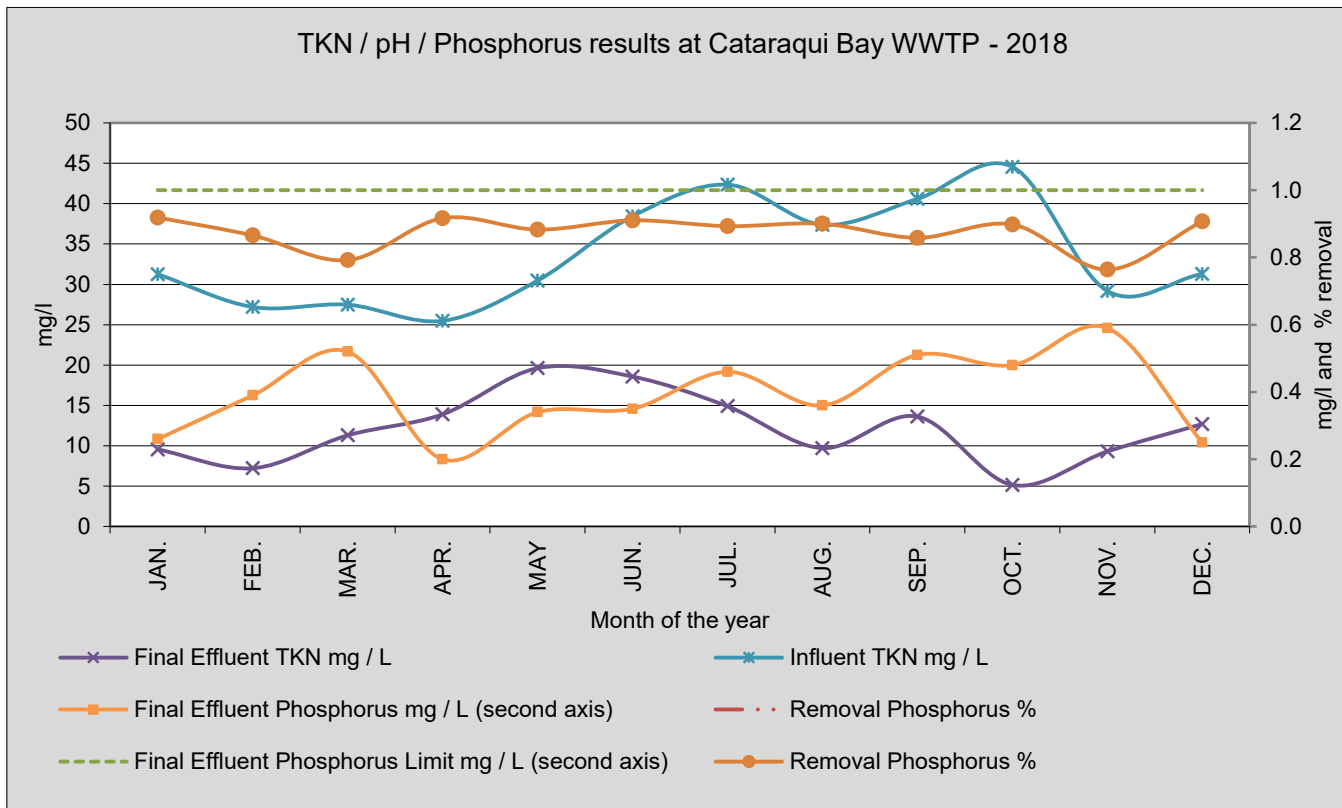
## 2018 ANNUAL REPORT

### Monthly data

Month	Unit	TKN / Influent pH / Phosphorus					
		Influent	Final Effluent	Influent	Influent	Final Effluent	Removal
		TKN mg / L	TKN mg / L	pH	Phosphorus mg / L (second axis)	Phosphorus mg / L (second axis)	Phosphorus %
JAN.		31.26	9.56	7.54	3.20	0.26	92%
FEB.		27.20	7.23	7.56	2.90	0.39	87%
MAR.		27.48	11.30	7.75	2.50	0.52	79%
APR.		25.48	13.90	7.79	2.40	0.20	92%
MAY		30.46	19.62	7.61	2.90	0.34	88%
JUN.		38.43	18.58	7.47	3.90	0.35	91%
JUL.		42.35	14.90	7.49	4.30	0.46	89%
AUG.		37.38	9.72	7.63	3.60	0.36	90%
SEP.		40.58	13.63	7.59	3.60	0.51	86%
OCT.		44.56	5.16	7.59	4.70	0.48	90%
NOV.		29.18	9.30	7.65	2.50	0.59	76%
DEC.		31.30	12.70	7.65	2.70	0.25	91%
Average		33.81	12.13	7.61	3.27	0.39	88%
Objective						1.0	
Limit						1.0	



# CATARAQUI BAY Wastewater Treatment Plant 2018 ANNUAL REPORT Monthly Graphs





# CATARAQUI BAY Wastewater Treatment Plant

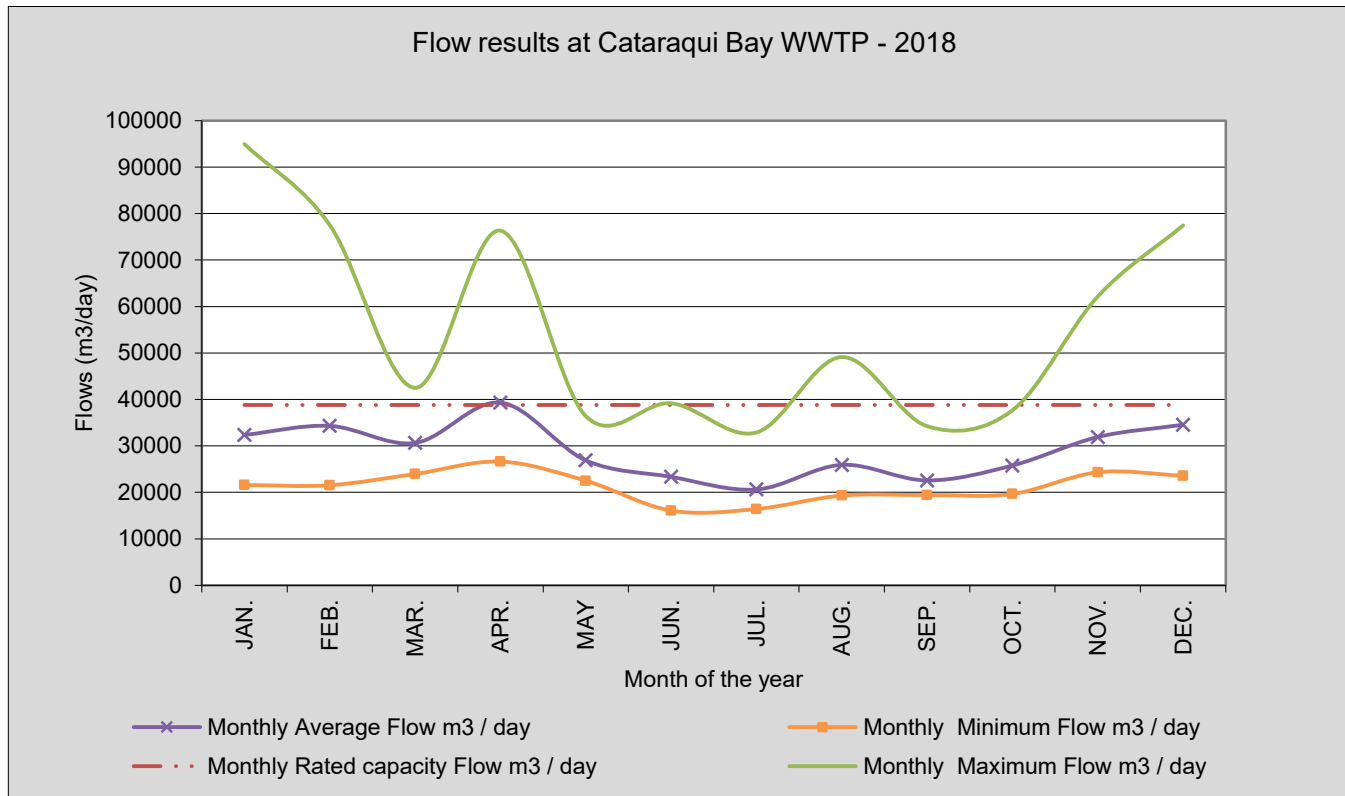
## 2018 ANNUAL REPORT

### Monthly data

effluent flow		Flows				
		Monthly	Monthly	Monthly	Monthly	Monthly
Month	Unit	Minimum Flow	Rated capacity Flow	Maximum Flow	Average Flow	Total Flow
		m3 / day	m3 / day	m3 / day	m3 / day	m3 / Month
JAN.		21,566	38,800	94,957	32,349	1,002,828
FEB.		21,536	38,800	77,526	34,301	960,429
MAR.		23,946	38,800	42,491	30,632	949,582
APR.		26,617	38,800	76,326	39,307	1,179,202
MAY		22,499	38,800	36,418	26,883	833,385
JUN.		16,076	38,800	39,164	23,334	700,019
JUL.		16,403	38,800	32,882	20,608	638,860
AUG.		19,302	38,800	49,122	25,910	803,196
SEP.		19,428	38,800	34,243	22,555	676,654
OCT.		19,652	38,800	37,657	25,775	799,030
NOV.		24,319	38,800	62,132	31,904	957,116
DEC.		23,576	38,800	77,442	34,551	1,071,082
Average Objective Limit		21,243	38,800	55,030	29,009	880,949



# CATARAQUI BAY Wastewater Treatment Plant 2018 ANNUAL REPORT Monthly Graphs





# CATARAQUI BAY Wastewater Treatment Plant

## 2018 ANNUAL REPORT

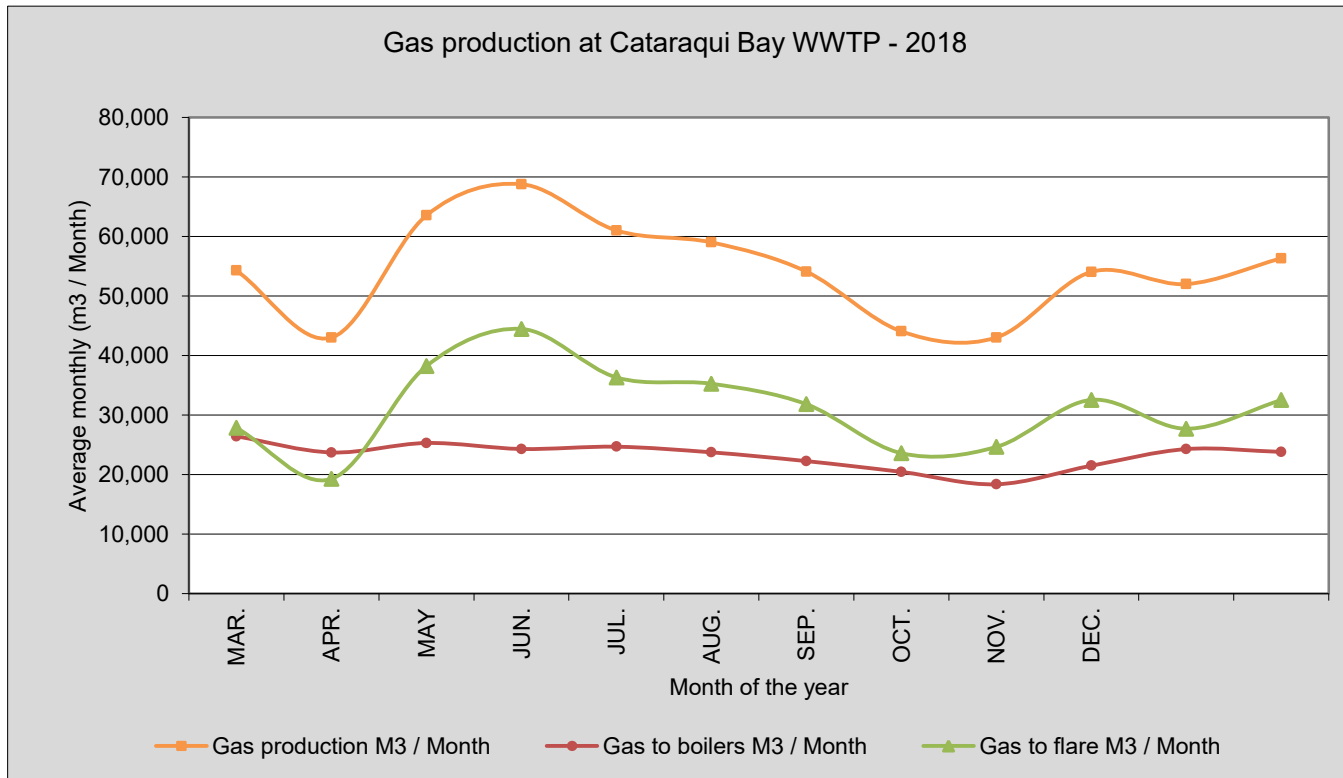
### Monthly data

Month	Digester gas production		
	Gas production	Gas to boilers	Gas to flare
Unit	M3 / Month	M3 / Month	M3 / Month
JAN.	54,299	26,448	27,851
FEB.	43,037	23,740	19,297
MAR.	63,564	25,325	38,239
APR.	68,806	24,321	44,485
MAY	61,040	24,701	36,339
JUN.	59,033	23,754	35,279
JUL.	54,126	22,281	31,845
AUG.	44,081	20,470	23,611
SEP.	43,054	18,390	24,664
OCT.	54,080	21,508	32,572
NOV.	52,026	24,302	27,724
DEC.	56,359	23,828	32,531
Average	54,459	23,255.7	31,203.1
<b>Total</b>	<b>653,505</b>	<b>279,068</b>	<b>374,437</b>





# CATARAQUI BAY Wastewater Treatment Plant 2018 ANNUAL REPORT Monthly Graphs





## **RAVENSVIEW WASTEWATER TREATMENT PLANT**



# **2018 ANNUAL REPORT**

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## REPORT CHECK LIST

Annual report submitted under Condition 10 of the certificate of approval 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.

## EXECUTIVE SUMMARY

The Ravensview Wastewater Facility operates under a Ministry of the Environment, Conservation and Parks, certificate of approval #2200-A82L2B. For the reporting year 2018 the facility was in compliance with all conditions outlined in condition 7 of the above mentioned Certificate of Approval and are briefly described in the following sections of this report.

Average flows through the plant decreased significantly from the extremely wet 2017 showing average flows of 69,146 m<sup>3</sup>/day.

The facility had three secondary bypass events in the 2018 reporting year. All by-pass details are listed in Table 7, the Bypass Summary section of this report.

Since the facilities commissioning in 2009, staff have been able to enhance the operation and to make this facility a highly rated Treatment facility. The Ravensview Facility continues to generate interest from international groups. We also are providing research opportunities to local Universities such as Queens to provide graduate students with valuable hands on experience.

As we continue into 2019, operational staff will continue to improve the operation of Ravensview and to use its state of the art technology to continually improve and 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 temporary septage receiving station is in place at the influent headworks for the local septage haulers while the new septage receiving station is under construction.

### 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 screenings press where the material is compacted and stored for offsite disposal.

## **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 micro-organisms which consume carbon dissolved in the water, as well as reducing ammonia and phosphorus. These microscopic organisms, referred to as biomass, stick onto the BioStyrene 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 micro-organisms which pass through the filters. Like other filters, these are backwashed occasionally to remove excess biomass growth and filtered particles, in order to restore the filters ability to process wastewater efficiently.

## **Disinfection**

Disinfection is accomplished by adding sodium hypochlorite at the effluent of the BAF facility. The effluent flows by gravity to the chlorine contact chamber where chlorine is allowed to be in contact with the wastewater. 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.

## **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 Biological Aerated Filter backwash water are settled in the clarifiers, then pumped into the digesters. The digesters are sealed, anaerobic (without oxygen). Inside, the mixture is heated to allow micro-organisms 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), and remains for 15 days in each digester 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 cylinders, 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. This beneficial use of the gas produced on the site helps offset the power purchased from the grid, and will offset the amount of gas required to heat the digesters.



## **Dewatering**

Liquid bio-solids which is about 2% solid and 98% water, is funnelled 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 augured 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**

All of the different devices and processes used at the Ravensview Wastewater Treatment Plant 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 certificate of approval number 2200-A82L2B were complied with during the reporting period of 2018.

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

**Table 1: Effluent Parameters**

Effluent Objectives		
Effluent Parameter	Objective (mg/l)	2018 Results (avg.)
CBOD <sub>5</sub>	15.0	2 mg/l
Total suspended solids (TSS)	15.0	5 mg/l
Total Phosphorus	0.8	0.43 mg/l
Total Ammonia Nitrogen (October 01 to May 31)	12.0	1.63 mg/l
(June 01 to 30 and September 01 to 30)	7.0	1.33 mg/l
(July 01 to August 31)	5.0	1.94 mg/l
Total Chlorine Residual	Non-detectable	0.01 mg/l
E. Coli (Monthly Geometric Mean Density)	100 counts/ 100 ml	5 counts/ 100 ml

**Table 2: Effluent Limits**

Effluent Limits			
Effluent Parameter	Concentration Limit (mg/l)	Loading Limit from effluent (kg/d)	2018 annual average
CBOD <sub>5</sub>	25.0	2,375	110 (kg/d)
Suspended solids (TSS)	25.0	2,375	307 (kg/d)
Total Phosphorus	1.0	95	22.7 (kg/d)
pH	Maintained between 6.0 and 9.5		7.63
Acute lethality to rainbow trout			pass

**Table 3: Monthly Effluent Parameters**

<b>Maximum Monthly Comparison of Effluent 2018</b>				
<b>Month</b>	<b>CBOD5 max concen/max loading (mg/L_kg/day)</b>	<b>TSS max concen/max loading (mg/L_kg/day)</b>	<b>TP max concen/max loading (mg/L_kg/day)</b>	<b>E. coli (Monthly geometric mean density)</b>
January	4mg/L-300kg/day	8mg/L 400kg/day	0.51mg/l 54kg/day	6
February	2mg/L-300kg/day	6mg/L 700kg/day	0.62mg/l 43kg/day	2
March	4mg/L-300kg/day	10mg/L 600kg/day	0.72mg/l 45kg/day	2
April	5mg/L-600kg/day	12mg/L 1100kg/day	0.77mg/l 57kg/day	2
May	4mg/L-200kg/day	12mg/L 900kg/day	0.65mg/l 43kg/day	2
June	2mg/L-100kg/day	6mg/L 400kg/day	0.58mg/l 43kg/day	2
July	2mg/L-200kg/day	9mg/L 600kg/day	0.45mg/l 29kg/day	3
August	4mg/L-200kg/day	26mg/L 1500kg/day	0.53mg/l 41kg/day	8
September	5mg/L-300kg/day	12mg/L 500kg/day	0.56mg/l 22kg/day	9
October	6mg/L-300kg/day	18mg/L 920kg/day	0.36mg/l 30kg/day	19
November	5mg/L-200kg/day	10mg/L 500kg/day	0.69mg/l 36kg/day	2
December	4mg/L -200kg/day	10mg/L 700kg/day	0.58mg/l 21kg/day	2

**Table 4: Annual Plant Flows**

<b>Plant Flows (m<sup>3</sup>/day)</b>							
<b>Parameter</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>
Avg. m <sup>3</sup> /day	53,750	59,182	60,916	53,076	59,640	86,200	69,005
Max. m <sup>3</sup> /day	143,808	158,736	185,620	136,899	179,987	169,266	181,067
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)	57	62	69	56	63	91	73
% (peak/design)	75	82	96	71	93	88	94

**Table 5: Effluent Parameters**

Final Effluent Parameter Results								
Parameter (mg/l)	2012	2013	2014	2015	2016	2017	2018	LIMITS
CBOD <sub>5</sub>	2.6	2	2.2	1.5	1.78	1.17	2	25 mg/l
Suspended Solids	4.1	5.2	4.3	4.4	6.0	6.1	5	25 mg/l
Total Phosphorus	0.45	0.49	0.42	0.40	0.47	0.40	0.43	1.0 mg/l
Total Chlorine	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	< 0.04 mg/l
Acute Lethality	All Pass	All Pass	All Pass	All Pass	All Pass	All Pass	All Pass	Pass

## MAINTENANCE

In 2018 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.

- Digester 2 mixing valve repairs and replacements
- Bar screen repairs
- Boiler control system upgrades
- Primary effluent pump rebuild
- Backwash tank cleanout
- Biosolids odour control system Carbon media change out
- Primary tank inspections
- Annual infrared scans on HV electrical
- Routine vibration monitoring

## CAPITAL WORKS

The major highlights for capital works in 2018 at the Ravensview WWTP and associated sewage collection system were:

- Repair and waterproofing of digester roofs
- Continued work on the Wastewater Master Plan assessment.
- Construction of a new Septage receiving station
- Construction of the new Riverview Way Sewage Pumping Station
- Dalton Ave Pumping Station upgrades and refurbishment

## Operations

Adequate staffing as well as preventative maintenance and regular equipment inspections lead to operational problems being diagnosed quickly and corrective actions implemented 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 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.

## BIO-SOLIDS MANAGEMENT

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

In January of 2018, the dewatering facility at Cataraqui Bay Sewage Treatment Plant was under construction so liquid sludge was hauled to the Ravensview WWTP for processing. An approximately volume of 38,153m<sub>3</sub> of liquid sludge was transported from Cataraqui Bay Wastewater Treatment Plant to the Ravensview Wastewater Treatment Plant in 2018. With the combination of both Ravensview WWTP and Cataraqui Bay WWTP liquid sludge to process a combined volume of 119,590 m<sub>3</sub> of liquid sludge was processed through the centrifuge, and approximately 12,776 m<sub>3</sub> of sludge cake was stored on site until land applied on licensed agricultural fields. Land application is completed by Smith's Pumping service.

It is too hard to predict exactly where and when we will spread in 2019, as crops and weather will be the major variables that we will be dealing with in the 2019 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 2018**

<u>C Of A and NASM Plan #</u>	<u>Address</u>	<u>Expiry Date</u>
21808	Middle Rd.	31/12/2018
21819	Hamilton Rd.	31/12/2018
21940	SunEdison Property	31/12/2018
22144	McIntyre Rd.	31/12/2019
22243	Multiple Farms (Milligan)	31/12/2019
22281	Haig Rd.	31/12/2019
22383	Brown Rd.	31/12/2020
22685	Multiple Farms	31/12/2020
22694	South Shore Rd.	31/12/2020
22853	Huffman Rd.	31/12/2021
22855	Lake Rd.	31/12/2021
22901	County Rd. 8	31/12/2021
22987	Sunbury Rd.	31/12/2021
23007	County Rd. 4	31/12/2021
23047	Palace Rd.	31/12/2021
23074	Simmons Rd.	31/12/2021
23110	Sunbury Rd.	31/12/2020
23119	Hamilton Rd.	31/12/2021
23215	Sand Hill Rd.	31/12/2021

## EQUIPMENT CALIBRATIONS

All of 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 concerning the Ravensview Wastewater Treatment Plant operations for the reporting year 2018. Due to construction at the Cataraqui Bay Wastewater Treatment Plant and construction of the new septage receiving facility, liquid sludge hauling and a temporary septage receiving station resulted in additional odours. 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 2018. Table 8 summarizes the test results from samples taken during the 2018 bypass events at King – Collingwood CSO and King- George CSO as well as test results for secondary bypasses at Ravensview WWTP.

**Table 7: Bypass Summaries**

<b>Bypass Event Record</b>						
<b>Date mm/dd/yyyy</b>	<b>Location</b>	<b>Start Time</b>	<b>End Time</b>	<b>Volume (m<sup>3</sup>)</b>	<b>Reason For Bypass</b>	<b>Precip (mm)</b>
01/12/2018	West end of Sherwood Dr	1:12	18:01	3969.62	Heavy rain/ rapid snow melt	38.1
01/12/2018	South end of Parkway	7:37	9:35	51.55	Heavy rain/rapid snow melt	38.1
01/12/2018 – 01/13/2018	South end of Parkway	6:21	12:12	168.76	Heavy rain/rapid snow melt	38.1
01/12/2018	535 Rideau Belle Park Trunk	4:02	18:59	5365.02	Heavy rain/rapid snow melt	38.1
01/12/2018 – 01/13/2018	535 Rideau Belle Park Local	3:10	00:16	17126.93	Heavy rain/rapid snow melt	38.1
01/11/2018 – 01/12/2018	Earl St W of Ontario St	21:01	14:43	545.54	Heavy rain/rapid snow melt	38.1
01/12/2018	West St S of King St	3:14	20:20	7290	Heavy rain/rapid snow melt	38.1
01/12/2018 – 01/13/2018	King-George CSO	2:03	1:21	15644.4	Heavy rain/rapid snow melt	38.1
01/11/2018 – 01/13/2018	King-Collingwood CSO	22:35	6:10	40614.75	Heavy rain/rapid snow melt	38.1
02/20/2018 – 02/21/2018	535 Rideau Belle Park Local	12:25	14:48	5896.05	Heavy rain/rapid snow melt	26.1
02/20/2018	Earl St W of Ontario St	11:10	12:21	0.15	Heavy rain/rapid snow melt	26.1
02/20/2018	West St S of King St	13:02	23:15	1246	Heavy rain/rapid snow melt	26.1

### Bypass Event Record

02/20/2018 – 02/21/2018	King-George CSO	11:38	21:25	10836.6	Heavy rain/rapid snow melt	26.1
02/20/2018 – 02/22/2018	King-Collingwood CSO	9:38	00:20	35691.13	Heavy rain/rapid snow melt	26.1
04/04/2018	Union St at Division St	15:33	15:34	1	Rain	26.6
04/04/2018	Earl St W of Ontario St	3:36	4:19	1.75	Rain	26.6
04/18/2018	King-Collingwood CSO	21:30	22:00	311.55	Prolonged rain	30.3
05/15/2018	Union St at Division St	6:38	6:50	0.58	Heavy rains	35.2
05/15/2018	535 Rideau Belle Park Local	6:24	7:01	259.3	Heavy rains	35.2
05/15/2018	Clarence St W of King St	6:41	6:56	103.11	Heavy rains	35.2
05/15/2018	Earl St W of Ontario St	18:16	9:55	443.93	Heavy rains	35.2
05/15/2018	Lower Union W of Ontario St	6:27	6:49	79.12	Heavy rains	35.2
05/15/2018	West St S of King St	6:41	6:48	11	Heavy rains	35.2
05/15/2018	King-George CSO	9:05	11:15	1036.8	Heavy rains	35.2
06/03/2018 – 06/04/2018	Earl St W of Ontario St	23:04	5:13	8.29	Heavy rains	20.6
06/13/2018	Union St at Division St	18:24	18:26	0.03	Heavy downpour	20.6



### Bypass Event Record

<b>06/13/2018</b>	<b>535 Rideau Belle Park Local</b>	<b>18:23</b>	<b>18:39</b>	<b>206.13</b>	<b>Heavy downpour</b>	<b>20.6</b>
<b>06/13/2018</b>	<b>Raglan Rd at Rideau St</b>	<b>18:24</b>	<b>18:29</b>	<b>8.79</b>	<b>Heavy downpour</b>	<b>20.6</b>
<b>06/13/2018</b>	<b>Lower Union W of Ontario St</b>	<b>18:24</b>	<b>18:36</b>	<b>52.37</b>	<b>Heavy downpour</b>	<b>20.6</b>
<b>06/27/2018</b>	<b>Earl St W of Ontario St</b>	<b>13:28</b>	<b>19:32</b>	<b>9.12</b>	<b>Rain</b>	<b>18.2</b>
<b>06/28/2018 – 06/29/2018</b>	<b>Earl St W of Ontario St</b>	<b>17:35</b>	<b>8:47</b>	<b>2.13</b>	<b>Blockage</b>	<b>0</b>
<b>07/10/2018</b>	<b>Earl St W of Ontario St</b>	<b>15:25</b>	<b>15:50</b>	<b>55.16</b>	<b>Brief thunderstorm</b>	<b>5.7</b>
<b>07/25/2018</b>	<b>535 Rideau Belle Park Local</b>	<b>11:57</b>	<b>12:18</b>	<b>51.74</b>	<b>Heavy rain</b>	<b>63.1</b>
<b>07/25/2018</b>	<b>Earl St W of Ontario St</b>	<b>00:51</b>	<b>00:55</b>	<b>387.86</b>	<b>Heavy rain</b>	<b>63.1</b>
<b>07/25/2018</b>	<b>Lower Union W of Ontario St</b>	<b>2:13</b>	<b>2:26</b>	<b>50.89</b>	<b>Heavy rain</b>	<b>63.1</b>
<b>08/07/2018</b>	<b>535 Rideau Belle Park Local</b>	<b>4:24</b>	<b>4:35</b>	<b>141.47</b>	<b>Thunderstorm</b>	<b>12.7</b>
<b>08/07/2018</b>	<b>Earl St W of Ontario St</b>	<b>4:20</b>	<b>5:11</b>	<b>135.5</b>	<b>Thunderstorm</b>	<b>12.7</b>
<b>08/07/2018</b>	<b>Lower Union W of Ontario St</b>	<b>4:23</b>	<b>4:28</b>	<b>13.24</b>	<b>Thunderstorm</b>	<b>12.7</b>
<b>08/08/2018</b>	<b>535 Rideau Belle Park Local</b>	<b>15:55</b>	<b>16:08</b>	<b>120.42</b>	<b>Heavy rain</b>	<b>30.3</b>
<b>08/08/2018</b>	<b>Earl St W of Ontario St</b>	<b>15:48</b>	<b>17:53</b>	<b>65.73</b>	<b>Heavy rain</b>	<b>30.3</b>

### Bypass Event Record

08/15/2018	West end of Sherwood Dr	21:53	1:50	1178.42	Multiple thunderstorms	79.8
08/15/2018	South end of Parkway	22:27	23:30	18.95	Multiple thunderstorms	79.8
08/15/2018	Helen St at Mack St	16:45	11:45	96.51	Multiple thunderstorms	79.8
08/15/2018	Union St at Division St	16:18	22:12	63.38	Multiple thunderstorms	79.8
08/15/2018	535 Rideau Belle Park Trunk	18:27	22:11	696.45	Multiple thunderstorms	79.8
08/15/2018	535 Rideau Belle Park Local	16:21	2:47	5789.64	Multiple thunderstorms	79.8
08/15/2018	Raglan Rd at Rideau St	16:19	22:25	608.59	Multiple thunderstorms	79.8
08/15/2018	Clarence St W of King St	16:23	22:18	2227.88	Multiple thunderstorms	79.8
08/15/2018	William St W of Ontario St	16:19	21:48	468.93	Multiple thunderstorms	79.8
08/15/2018	Earl St W of Ontario St	16:13	2:10	4070.36	Multiple thunderstorms	79.8
08/15/2018	Gore St W of Ontario St	16:21	21:52	615.82	Multiple thunderstorms	79.8
08/15/2018	Lower Union W of Ontario St	16:18	22:50	1170.46	Multiple thunderstorms	79.8
08/15/2018	West St S of King St	16:27	3:05	10804	Multiple thunderstorms	79.8
08/15/2018	Barrack St E of King St	4:33	23:01	315	Multiple thunderstorms	79.8

<b>Bypass Event Record</b>						
<b>08/15/2018</b>	<b>Quebec St at Barrie St</b>	<b>16:17</b>	<b>22:02</b>	<b>2052.11</b>	<b>Multiple thunderstorms</b>	<b>79.8</b>
<b>08/15/2018</b>	<b>Palace Rd Ps</b>	<b>16:36</b>	<b>17:05</b>	<b>21.11</b>	<b>Multiple thunderstorms</b>	<b>79.8</b>
<b>08/15/2018</b>	<b>King-George CSO</b>	<b>16:37</b>	<b>7:10</b>	<b>22864</b>	<b>Multiple thunderstorms</b>	<b>79.8</b>
<b>08/15/2018</b>	<b>King- Collingwood CSO</b>	<b>16:45</b>	<b>2:02</b>	<b>6350.25</b>	<b>Multiple thunderstorms</b>	<b>79.8</b>
<b>08/15/2018</b>	<b>Ravensview WWTP (Secondary Bypass)</b>	<b>17:10</b>	<b>18:34</b>	<b>2868</b>	<b>Multiple thunderstorms</b>	<b>79.8</b>
<b>08/27/2018 – 08/28/2018</b>	<b>Ravensview WWTP (Secondary Bypass)</b>	<b>23:45</b>	<b>1:45</b>	<b>2160</b>	<b>Brief Thunderstorm</b>	<b>9.7</b>
<b>08/28/2018</b>	<b>Ravensview WWTP (Secondary Bypass)</b>	<b>16:08</b>	<b>16:32</b>	<b>295</b>	<b>Pump failure</b>	<b>0</b>
<b>09/21/2018</b>	<b>Earl St W of Ontario St</b>	<b>4:10</b>	<b>9:58</b>	<b>204.05</b>	<b>Rain</b>	<b>16.7</b>
<b>09/21/2018</b>	<b>Lower Union W of Ontario St</b>	<b>6:25</b>	<b>9:26</b>	<b>51.92</b>	<b>Rain</b>	<b>16.7</b>
<b>09/26/2018</b>	<b>535 Rideau Belle Park Local</b>	<b>1:18</b>	<b>1:21</b>	<b>0.37</b>	<b>Rain</b>	<b>20.7</b>
<b>09/26/2018</b>	<b>Earl St W of Ontario St</b>	<b>1:10</b>	<b>2:36</b>	<b>245.39</b>	<b>Rain</b>	<b>20.7</b>
<b>09/26/2018</b>	<b>Lower Union W of Ontario St</b>	<b>1:21</b>	<b>1:39</b>	<b>47.23</b>	<b>Rain</b>	<b>20.7</b>
<b>10/02/2018</b>	<b>Earl St W of Ontario St</b>	<b>6:49</b>	<b>20:38</b>	<b>12.14</b>	<b>Rain</b>	<b>23.7</b>

### Bypass Event Record

<b>09/26/2018</b>	<b>Earl St W of Ontario St</b>	<b>8:40</b>	<b>8:56</b>	<b>0.00086</b>	<b>Rain</b>	<b>7.1</b>
<b>10/11/2018</b>	<b>Earl St W of Ontario St</b>	<b>2:23</b>	<b>3:55</b>	<b>10.97</b>	<b>Rain</b>	<b>10.2</b>
<b>11/06/2018</b>	<b>Earl St W of Ontario St</b>	<b>15:10</b>	<b>15:42</b>	<b>0.01</b>	<b>Rain</b>	<b>8.1</b>
<b>11/26/2018</b>	<b>Earl St W of Ontario St</b>	<b>11:33</b>	<b>11:38</b>	<b>0.009</b>	<b>Rain</b>	<b>24.5</b>
<b>12/02/2018</b>	<b>Earl St W of Ontario St</b>	<b>10:25</b>	<b>12:40</b>	<b>11.67</b>	<b>Rain</b>	<b>11.5</b>
<b>12/21/2018</b>	<b>King-Collingwood CSO</b>	<b>5:00</b>	<b>9:27</b>	<b>771.5</b>	<b>Heavy rain</b>	<b>65.7</b>
<b>12/21/2018</b>	<b>Helen St at Mack St</b>	<b>19:15</b>	<b>21:50</b>	<b>41.77</b>	<b>Heavy rain</b>	<b>65.7</b>
<b>12/21/2018</b>	<b>535 Rideau Belle Park Trunk</b>	<b>20:09</b>	<b>22:00</b>	<b>148.33</b>	<b>Heavy rain</b>	<b>65.7</b>
<b>12/21/2018 – 12/22/2018</b>	<b>535 Rideau Belle Park Local</b>	<b>19:01</b>	<b>6:28</b>	<b>5782.97</b>	<b>Heavy rain</b>	<b>65.7</b>
<b>12/21/2018</b>	<b>Earl St W of Ontario St</b>	<b>17:18</b>	<b>17:57</b>	<b>522.7</b>	<b>Heavy rain</b>	<b>65.7</b>
<b>12/21/2018 – 12/22/2018</b>	<b>West St S of King St</b>	<b>19:11</b>	<b>1:25</b>	<b>951</b>	<b>Heavy rain</b>	<b>65.7</b>
<b>12/21/2018 – 12/22/2018</b>	<b>King-Collingwood CSO</b>	<b>18:18</b>	<b>17:35</b>	<b>17288.75</b>	<b>Heavy rain</b>	<b>65.7</b>
<b>12/21/2018 – 12/22/2018</b>	<b>King-George CSO</b>	<b>18:05</b>	<b>18:48</b>	<b>7349.4</b>	<b>Heavy rain</b>	<b>65.7</b>

**Table 8: Bypass Sampling Results**

Parameter	Units	Ravensview WWTP (Secondary Bypass) Annual Avg.	King-Collingwood CSO Annual Avg.	King-George CSO Annual Avg.
Total Coliform	Cfu/100mL	N/A	986482	1762380
E coli	Cfu/100mL	85147	122270	242067
HPC	Cfu/mL	N/A	328849	576889
CBOD5	Mg/L	18	14	21.8
TSS	Mg/L	86	53	65
TP	Mg/L	2.42	0.68	1.03
TKN	Mg/L	15.1	4.9	6.5

**Bypass Results Interpretations**

All bypass discharges have a higher bacteria count due to no disinfection occurring. CBOD<sub>5</sub>, TP & TKN results are much lower than typical raw sewage influent to the sewage plant due to the dilution of rain water during these events. All efforts are made to contain any debris 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**



# RAVENSVIEW Wastewater Treatment Plant

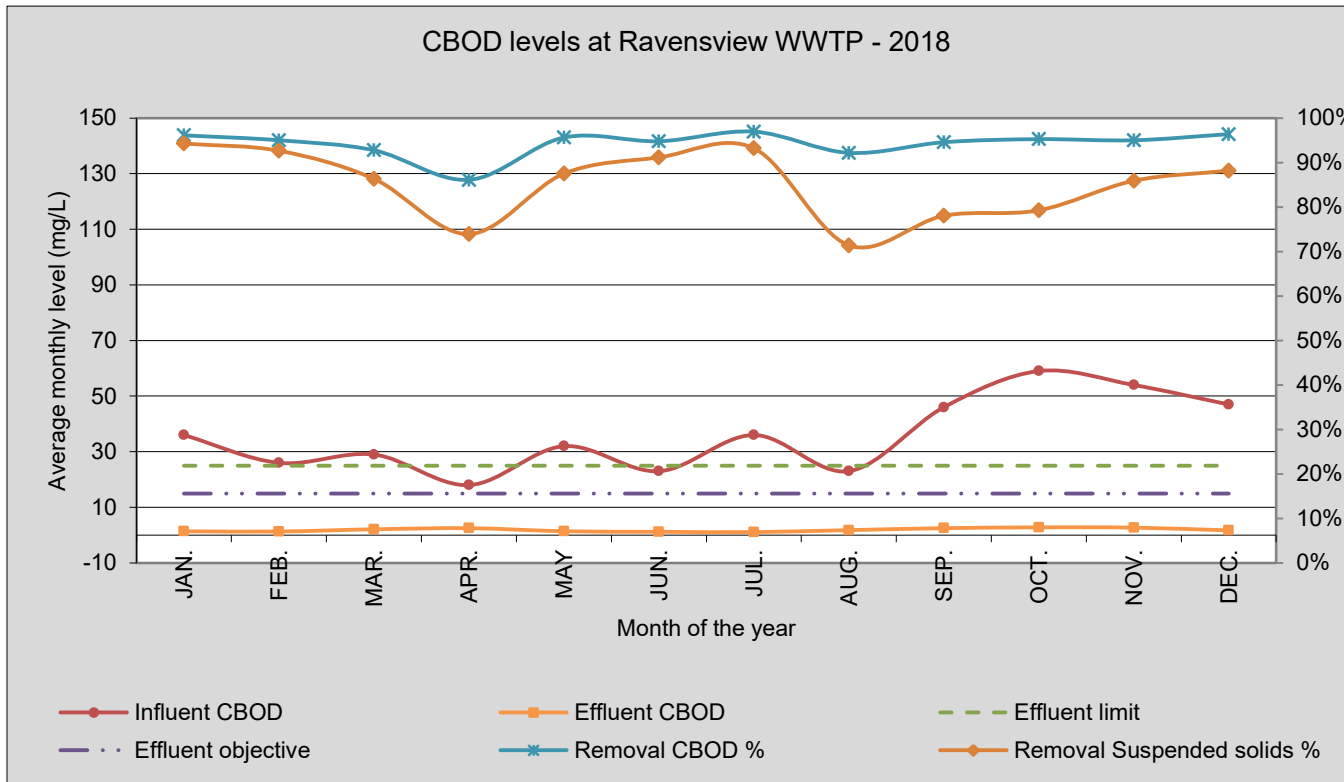
## 2018 ANNUAL REPORT

### Monthly data

Month	Raw sewage	Final Effluent	Removal	Raw sewage	Final Effluent	Removal	
	Units	CBOD mg/L	CBOD mg/L	CBOD %	Suspended solids mg/L	Suspended solids mg/L	Suspended solids %
JAN.		36.0	1.4	96%	82.0	4.7	94%
FEB.		26.0	1.3	95%	53.0	3.9	93%
MAR.		29.0	2.1	93%	30.0	4.1	86%
APR.		18.0	2.5	86%	23.0	6.0	74%
MAY		32.0	1.4	96%	36.0	4.5	88%
JUN.		23.0	1.2	95%	35.0	3.1	91%
JUL.		36.0	1.1	97%	50.0	3.4	93%
AUG.		23.0	1.8	92%	29.0	8.3	71%
SEP.		46.0	2.5	95%	51.0	11.2	78%
OCT.		59.0	2.8	95%	54.0	11.2	79%
NOV.		54.0	2.7	95%	39.0	5.5	86%
DEC.		47.0	1.7	96%	33.0	3.9	88%
Average		35.8	1.9	94%	42.9	5.8	86%
Objective			15.0			15.0	
Limit			25.0			25.0	



# RAVENSVIEW Wastewater Treatment Plant 2018 ANNUAL REPORT Monthly Graphs





# RAVENSVIEW Wastewater Treatment Plant

## 2018 ANNUAL REPORT

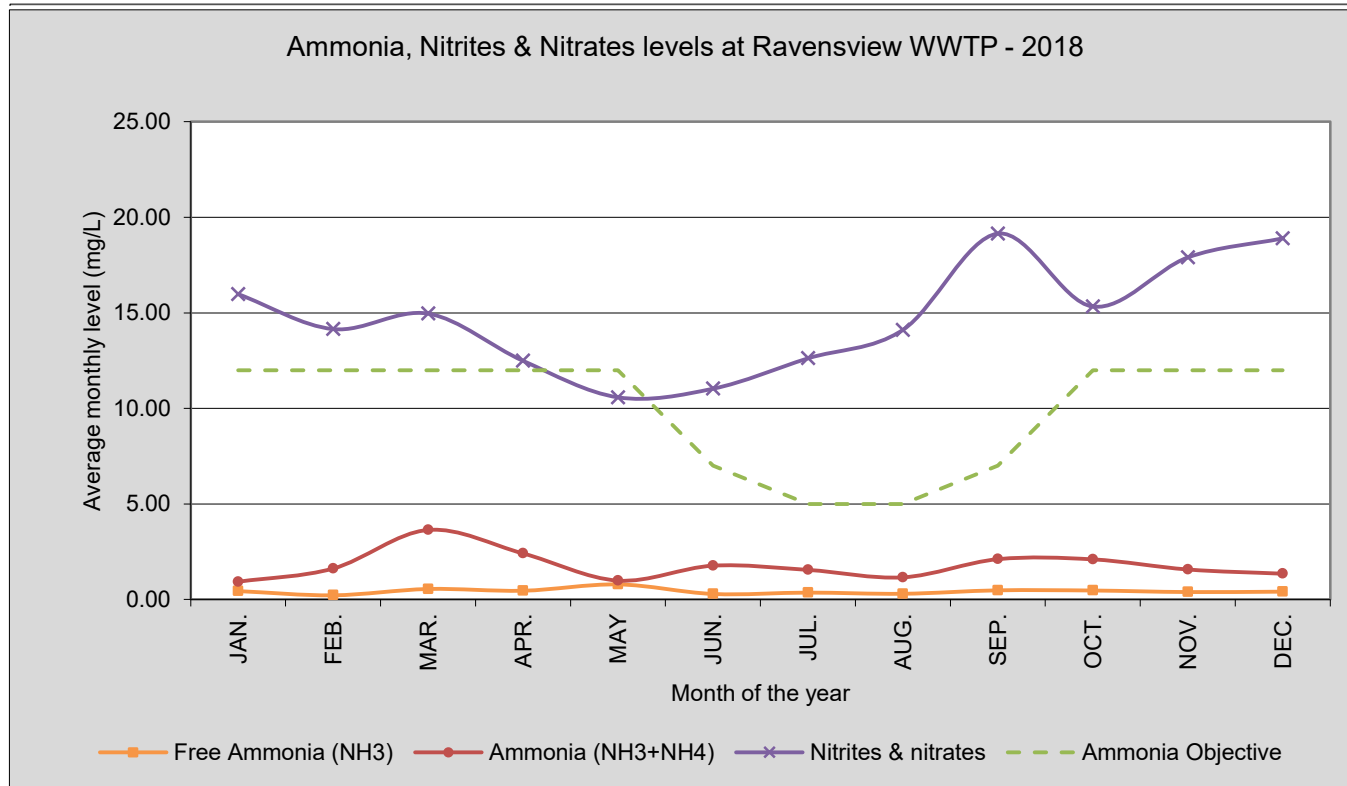
### Monthly data

Month	Unit	Final Effluent results				Final Effluent Acute lethality to trout pass / fail
		Raw sewage Free Ammonia (NH <sub>3</sub> ) mg/L	Final Effluent Ammonia (NH <sub>3</sub> +NH <sub>4</sub> ) mg/L	Final Effluent Ammonia Objective mg/L	Final Effluent Nitrites & nitrates mg/L	
JAN.		0.44	0.93	12.0	15.98	pass
FEB.		0.22	1.62	12.0	14.15	pass
MAR.		0.55	3.64	12.0	14.96	pass
APR.		0.46	2.41	12.0	12.49	pass
MAY		0.79	0.99	12.0	10.58	pass
JUN.		0.29	1.77	7.0	11.03	pass
JUL.		0.36	1.55	5.0	12.62	pass
AUG.		0.30	1.16	5.0	14.11	pass
SEP.		0.48	2.11	7.0	19.15	pass
OCT.		0.47	2.10	12.0	15.33	pass
NOV.		0.39	1.57	12.0	17.90	pass
DEC.		0.41	1.35	12.0	18.90	pass
Average Objective Limit		0.43	1.77 Variable		14.8	





# RAVENSVIEW Wastewater Treatment Plant 2018 ANNUAL REPORT Monthly Graphs





# RAVENSVIEW Wastewater Treatment Plant

## 2018 ANNUAL REPORT

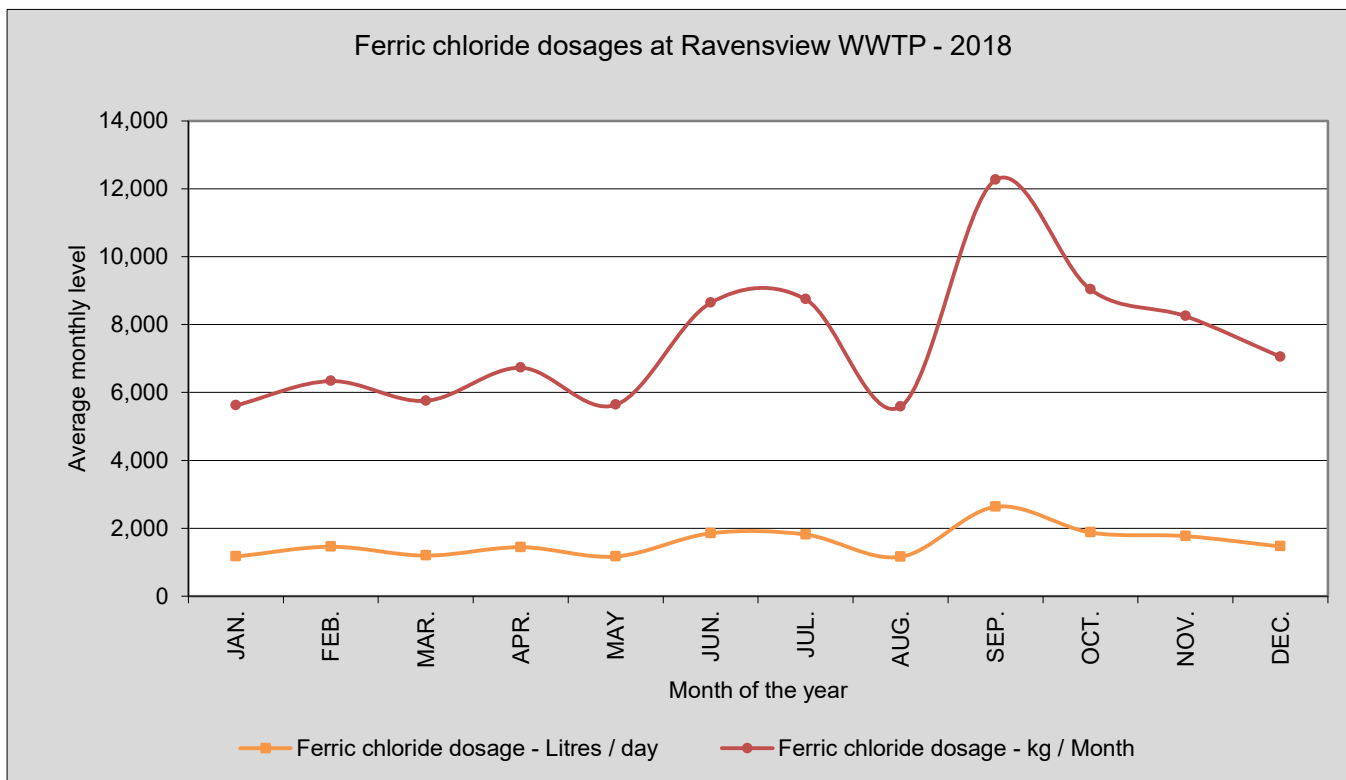
### Monthly data

#### Ferric chloride

Month	Unit	Dosage Litres / day	Dosage Kg / day	Dosage Litres / month	Dosage Kg / month	Dosage mg/L
JAN.		1,167	181	36,190	5,619	2.82
FEB.		1,458	226	40,810	6,336	3.09
MAR.		1,196	186	37,070	5,755	2.83
APR.		1,445	224	43,340	6,729	2.46
MAY		1,171	182	36,300	5,636	2.57
JUN.		1,855	288	55,660	8,641	4.81
JUL.		1,817	282	56,320	8,743	5.74
AUG.		1,160	180	35,970	5,584	3.54
SEP.		2,633	409	78,980	12,262	9.77
OCT.		1,877	291	58,190	9,034	6.59
NOV.		1,771	275	53,130	8,248	5.03
DEC.		1,465	228	45,430	7,053	4.04
Average Objective Limit		1,585	246	48,116	7,470.00	4.44



# RAVENSVIEW Wastewater Treatment Plant 2018 ANNUAL REPORT Monthly Graphs





# RAVENSVIEW Wastewater Treatment Plant

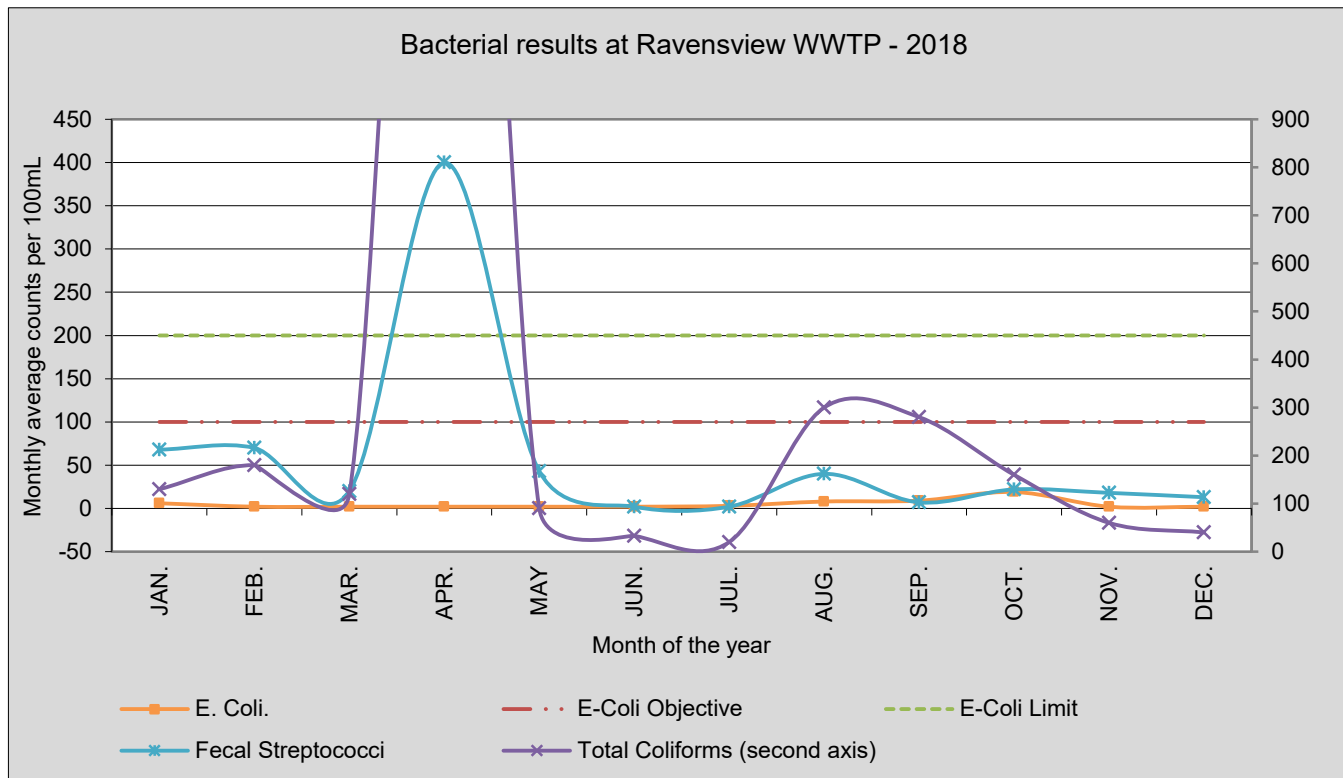
## 2018 ANNUAL REPORT

### Monthly data

Month	Bacterial results				Final Effluent Total Coliforms (second axis) counts / 100mL	Final Effluent Fecal Streptococci counts / 100mL
	Final Effluent E. Coli. counts / 100mL	E-Coli Objective counts / 100mL	E-Coli Limit counts / 100mL	Unit		
JAN.	6	100	200		130	68
FEB.	2	100	200		180	70
MAR.	2	100	200		120	20
APR.	2	100	200		2,700	400
MAY	2	100	200		90	43
JUN.	2	100	200		33	2
JUL.	3	100	200		20	2
AUG.	8	100	200		300	40
SEP.	9	100	200		280	7
OCT.	19	100	200		160	22
NOV.	2	100	200		60	18
DEC.	2	100	200		40	13
Average	4.92				342.75	58.75
Objective	100					
Limit	200					



# RAVENSVIEW Wastewater Treatment Plant 2018 ANNUAL REPORT Monthly Graphs





# RAVENSVIEW Wastewater Treatment Plant

## 2018 ANNUAL REPORT

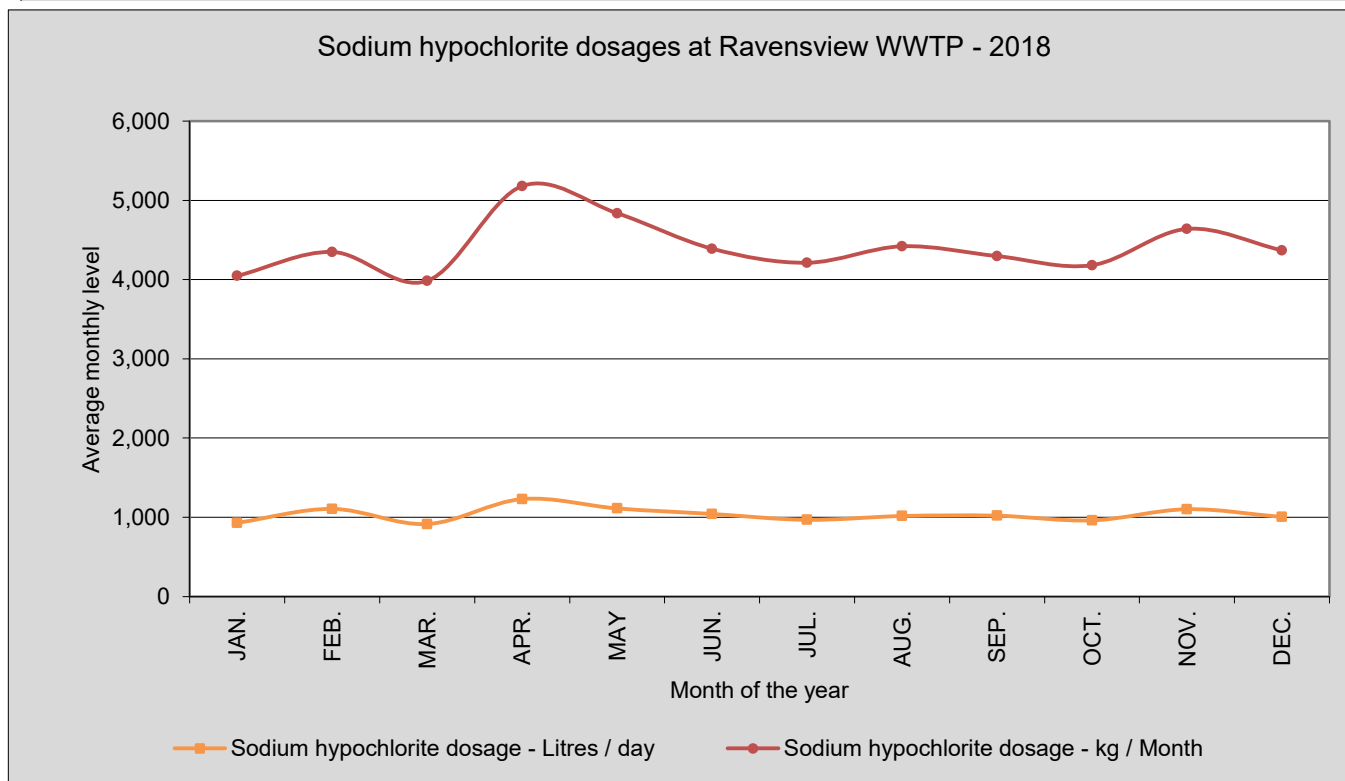
### Monthly data

#### Sodium hypochlorite

Month	Unit	Dosage Litres / day	Dosage Kg / day	Dosage Litres / month	Dosage Kg / month	Dosage mg/L	Residual mg/L
JAN.		930	130	28,822	4,047	2.10	0.80
FEB.		1,106	155	30,974	4,349	2.18	0.90
MAR.		915	129	28,375	3,984	1.97	0.78
APR.		1,230	173	36,903	5,181	1.95	0.73
MAY		1,112	156	34,461	4,838	2.24	0.84
JUN.		1,042	146	31,270	4,390	2.42	0.87
JUL.		968	136	30,009	4,213	2.72	0.94
AUG.		1,016	143	31,490	4,421	2.78	0.71
SEP.		1,020	143	30,604	4,297	3.39	0.91
OCT.		961	135	29,785	4,182	3.13	0.87
NOV.		1,102	155	33,049	4,640	2.82	0.95
DEC.		1,004	141	31,117	4,369	2.60	0.93
Average Objective Limit		1,034	145.2	31,405	4,409	2.53	0.85



# RAVENSVIEW Wastewater Treatment Plant 2018 ANNUAL REPORT Monthly Graphs





# RAVENSVIEW Wastewater Treatment Plant

## 2018 ANNUAL REPORT

### Monthly data

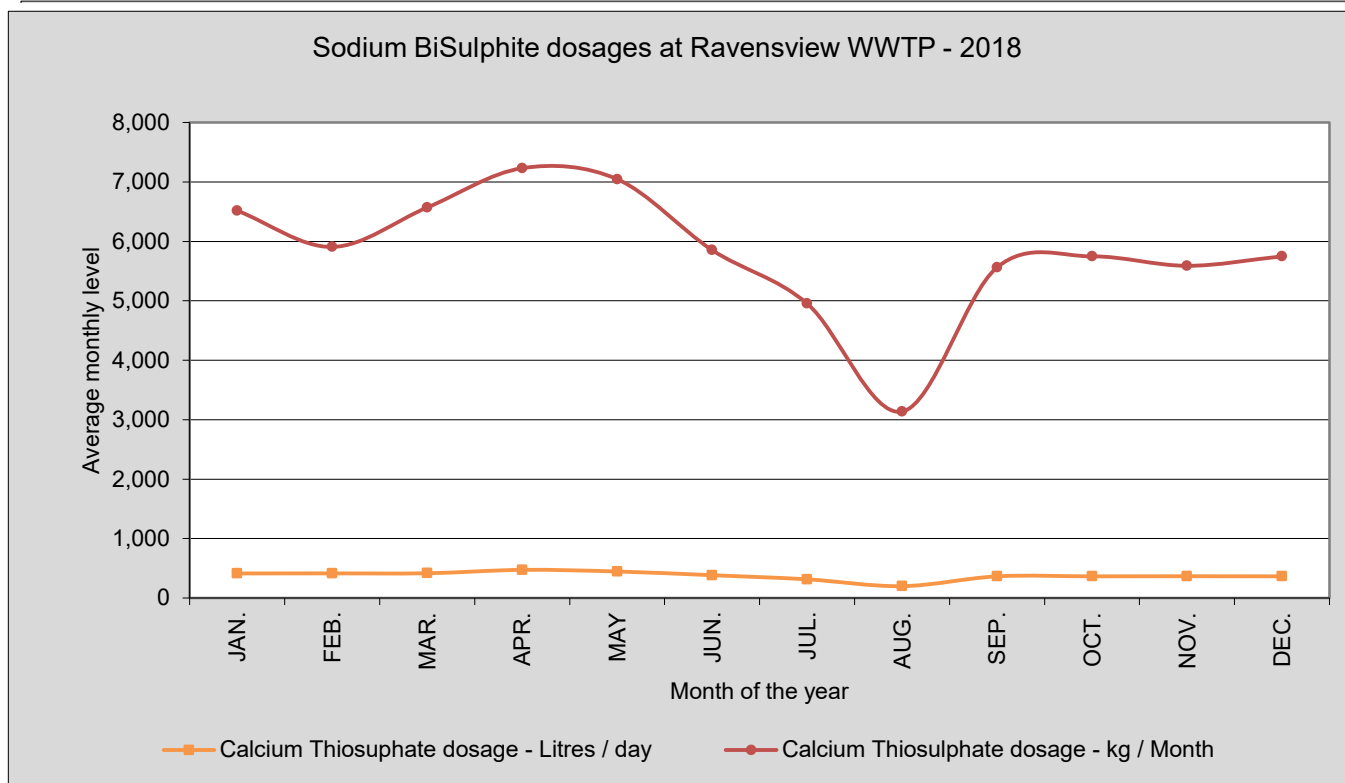
#### Sodium BiSulphite

Month	Unit	Dosage Litres / day	Dosage Kg / day	Dosage Litres / month	Dosage Kg / month	Dosage mg / L	Residual mg / L	Compliance Yes / No
JAN.		413	210	12,792	6,518	3.46	0.0	yes
FEB.		414	211	11,596	5,908	3.01	0.0	yes
MAR.		416	212	12,896	6,571	3.23	0.0	yes
APR.		473	241	14,196	7,233	2.82	0.0	yes
MAY		446	227	13,832	7,048	3.27	0.0	yes
JUN.		383	195	11,492	5,855	3.20	0.0	yes
JUL.		314	160	9,734	4,955	3.21	0.0	yes
AUG.		199	101	6,158	3,137	1.94	0.0	yes
SEP.		364	185	10,920	5,564	4.44	0.0	yes
OCT.		364	185	11,284	5,749	4.40	0.0	yes
NOV.		366	186	10,972	5,590	3.51	0.0	yes
DEC.		364	185	11,284	5,749	3.53	0.0	yes
Average Objective Limit		376	192	11,430	5,823	3.34	0.01	





# RAVENSVIEW Wastewater Treatment Plant 2018 ANNUAL REPORT Monthly Graphs





# RAVENSVIEW Wastewater Treatment Plant

## 2018 ANNUAL REPORT

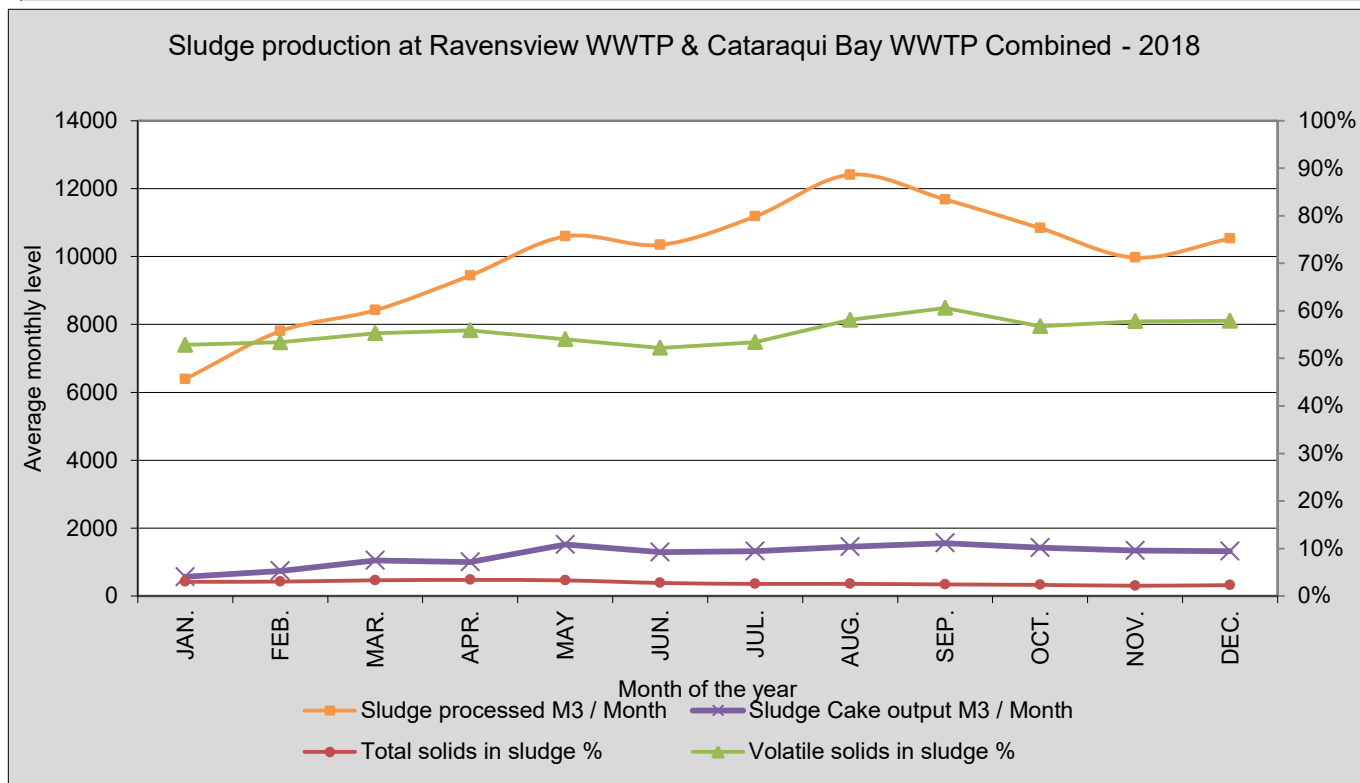
### Monthly data

Month	Digested sludge			Sludge Cake		
	Sludge processed	Total solids in sludge	Volatile solids in sludge	Sludge Cake output	Total solids in sludge cake	Vol. Solids sludge cake
Unit	M3 / Month	%	%	M3 / Month	%	%
JAN.	6390	3.0%	52.8%	565	28.8%	49.3%
FEB.	7801	3.0%	53.4%	738	25.8%	52.9%
MAR.	8419	3.3%	55.3%	1,052	25.3%	54.3%
APR.	9440	3.4%	55.9%	1,000	25.1%	54.3%
MAY	10592	3.3%	54.0%	1,519	25.0%	55.5%
JUN.	10344	2.8%	52.2%	1,294	26.6%	53.2%
JUL.	11180	2.6%	53.4%	1,318	26.4%	54.4%
AUG.	12409	2.6%	58.1%	1,454	25.1%	56.6%
SEP.	11680	2.5%	60.6%	1,562	25.2%	58.1%
OCT.	10837	2.4%	56.8%	1,425	24.4%	57.2%
NOV.	9968	2.2%	57.8%	1,343	26.4%	57.0%
DEC.	10530	2.3%	57.9%	1,318	26.7%	56.7%
Average	9,966	2.8%	55.7%	1,216	25.9%	55.0%
Total	119590					

\* Processed volumes are a combination of both Cataraqui Bay WWTP & Ravensview WWTP sludge productions.



# RAVENSVIEW Wastewater Treatment Plant 2018 ANNUAL REPORT Monthly Graphs





# RAVENSVIEW Wastewater Treatment Plant

## 2018 ANNUAL REPORT

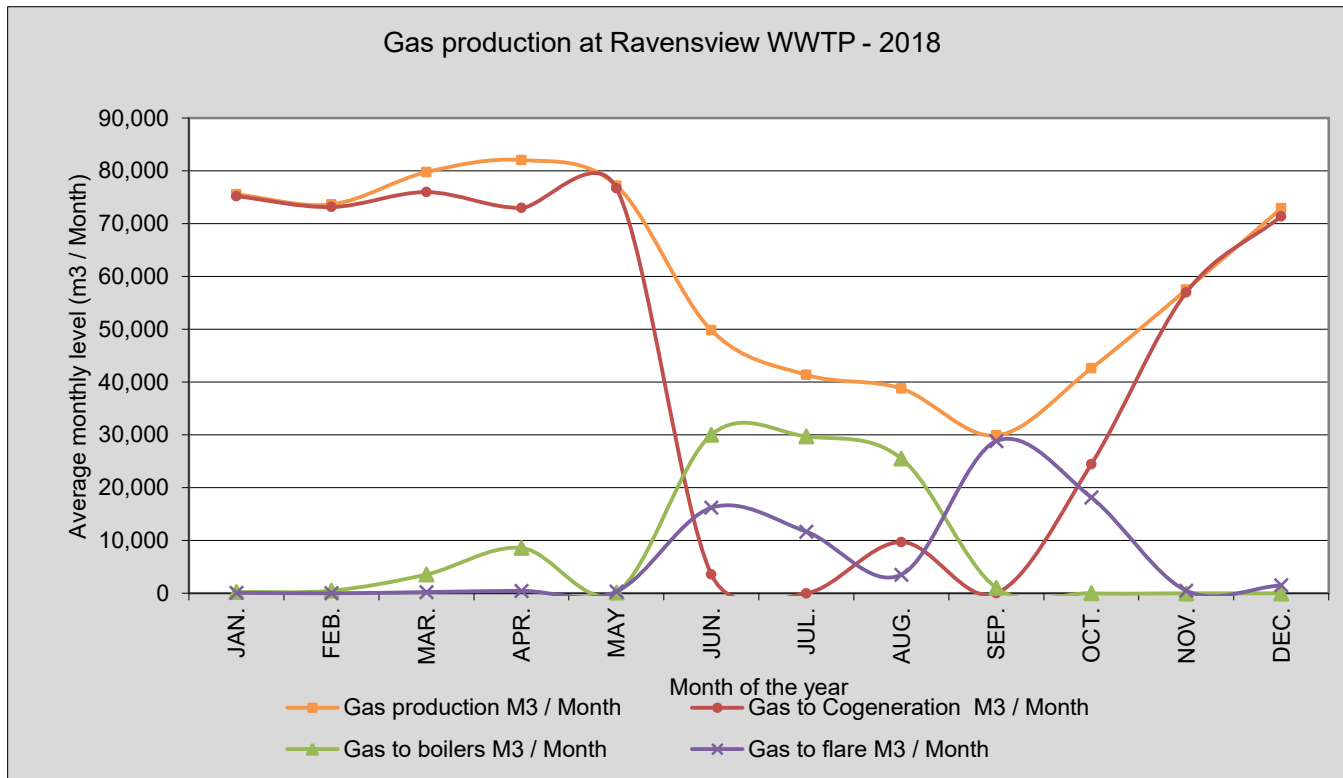
### Monthly data

#### Digester gas production

Month	Unit	Gas to			
		Gas production	Cogeneration	Gas to boilers	Gas to flare
		M3 / Month	M3 / Month	M3 / Month	M3 / Month
JAN.		75,534	75,190	246	98
FEB.		73,637	73,127	506	4
MAR.		79,746	75,955	3,560	231
APR.		82,029	72,971	8,586	472
MAY		77,189	76,698	160	331
JUN.		49,790	3,556	30,028	16,206
JUL.		41,363	0	29,696	11,667
AUG.		38,766	9,712	25,519	3,535
SEP.		29,876	2	1,045	28,829
OCT.		42,600	24,450	5	18,145
NOV.		57,466	56,964	0	502
DEC.		72,875	71,372	0	1,503
<b>Average</b>		60,073	44,999.8	8,279.3	6,793.6
<b>Total</b>		<b>720,871</b>	<b>539,997</b>	<b>99,351</b>	<b>81,523</b>



# RAVENSVIEW Wastewater Treatment Plant 2018 ANNUAL REPORT Monthly Graphs





# RAVENSVIEW Wastewater Treatment Plant

## 2018 ANNUAL REPORT

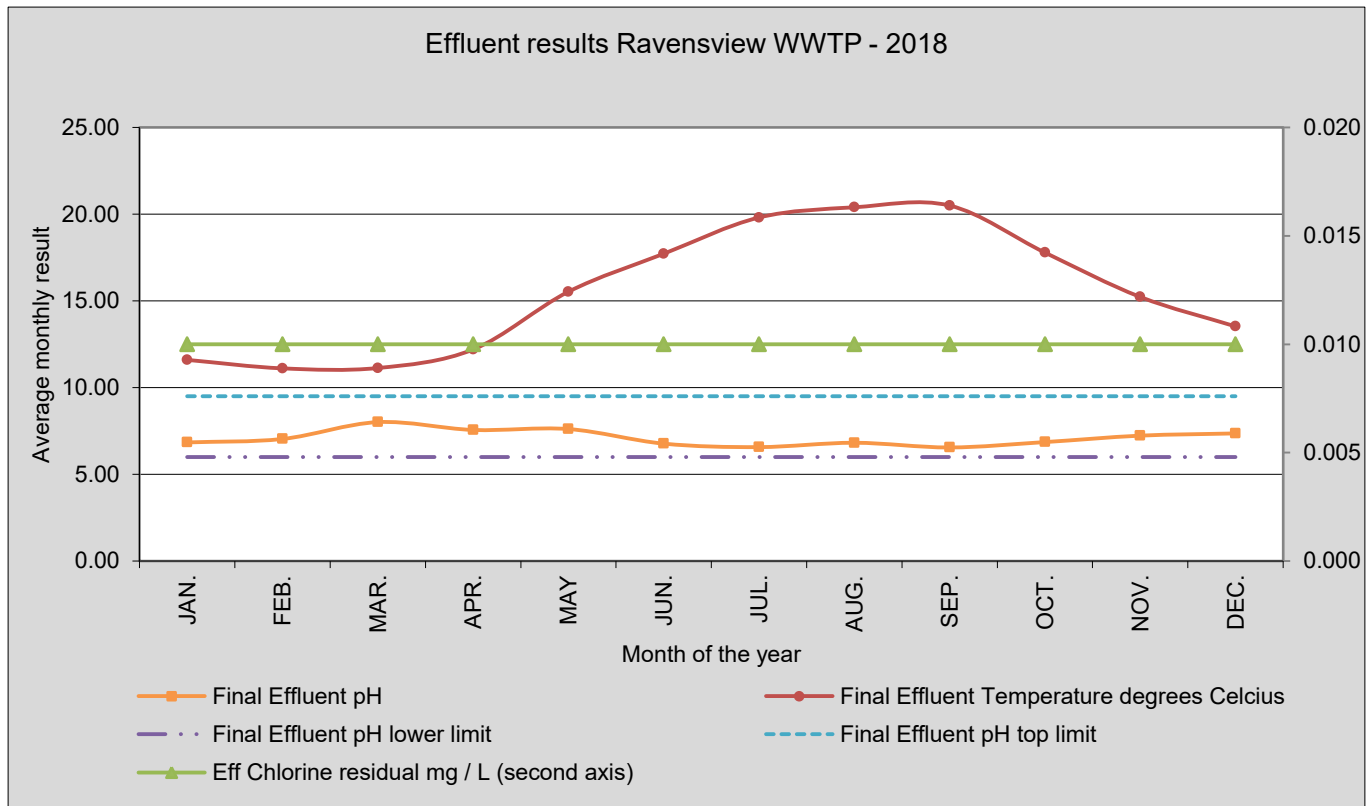
### Monthly data

#### Effluent Summary from daily samples

Month	Final Effluent pH	Final Effluent pH lower limit	Final Effluent pH top limit	Final Effluent Temperature	Eff Chlorine residual
	Unit			degrees Celcius	mg / L (second axis)
JAN.	6.84	6	9.5	11.6	0.0
FEB.	7.04	6	9.5	11.1	0.0
MAR.	8.01	6	9.5	11.1	0.0
APR.	7.56	6	9.5	12.2	0.0
MAY	7.61	6	9.5	15.5	0.0
JUN.	6.77	6	9.5	17.7	0.0
JUL.	6.57	6	9.5	19.8	0.0
AUG.	6.82	6	9.5	20.4	0.0
SEP.	6.55	6	9.5	20.5	0.0
OCT.	6.86	6	9.5	17.8	0.0
NOV.	7.23	6	9.5	15.2	0.0
DEC.	7.36	6	9.5	13.5	0.0
Average Objective Limit	7.1			15.5	0.01



# RAVENSVIEW Wastewater Treatment Plant 2018 ANNUAL REPORT Monthly Graphs





# RAVENSVIEW Wastewater Treatment Plant

## 2018 ANNUAL REPORT

### Monthly data

#### Polymer dosage

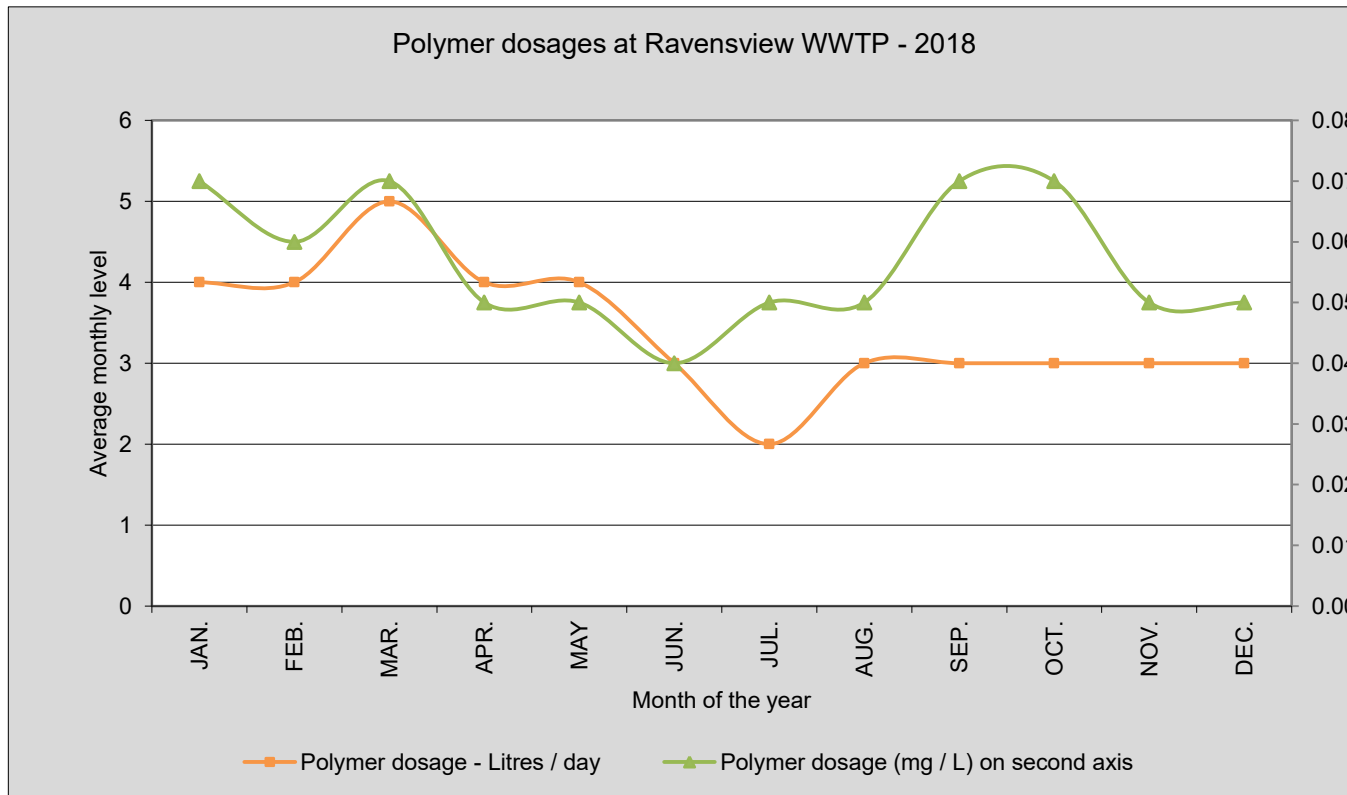
Month	Unit	Dosage*	Dosage	Dosage
		Kg / day	Kg / month	mg / L
JAN.		4	134	0.07
FEB.		4	122	0.06
MAR.		5	140	0.07
APR.		4	131	0.05
MAY		4	109	0.05
JUN.		3	81	0.04
JUL.		2	77	0.05
AUG.		3	79	0.05
SEP.		3	82	0.07
OCT.		3	88	0.07
NOV.		3	80	0.05
DEC.		3	81	0.05
<hr style="border: 2px solid orange;"/>				
Average		3.42	100	0.06
Objective				
Limit				

Note: \*: Calculated value





# RAVENSVIEW Wastewater Treatment Plant 2018 ANNUAL REPORT Monthly Graphs





# RAVENSVIEW Wastewater Treatment Plant

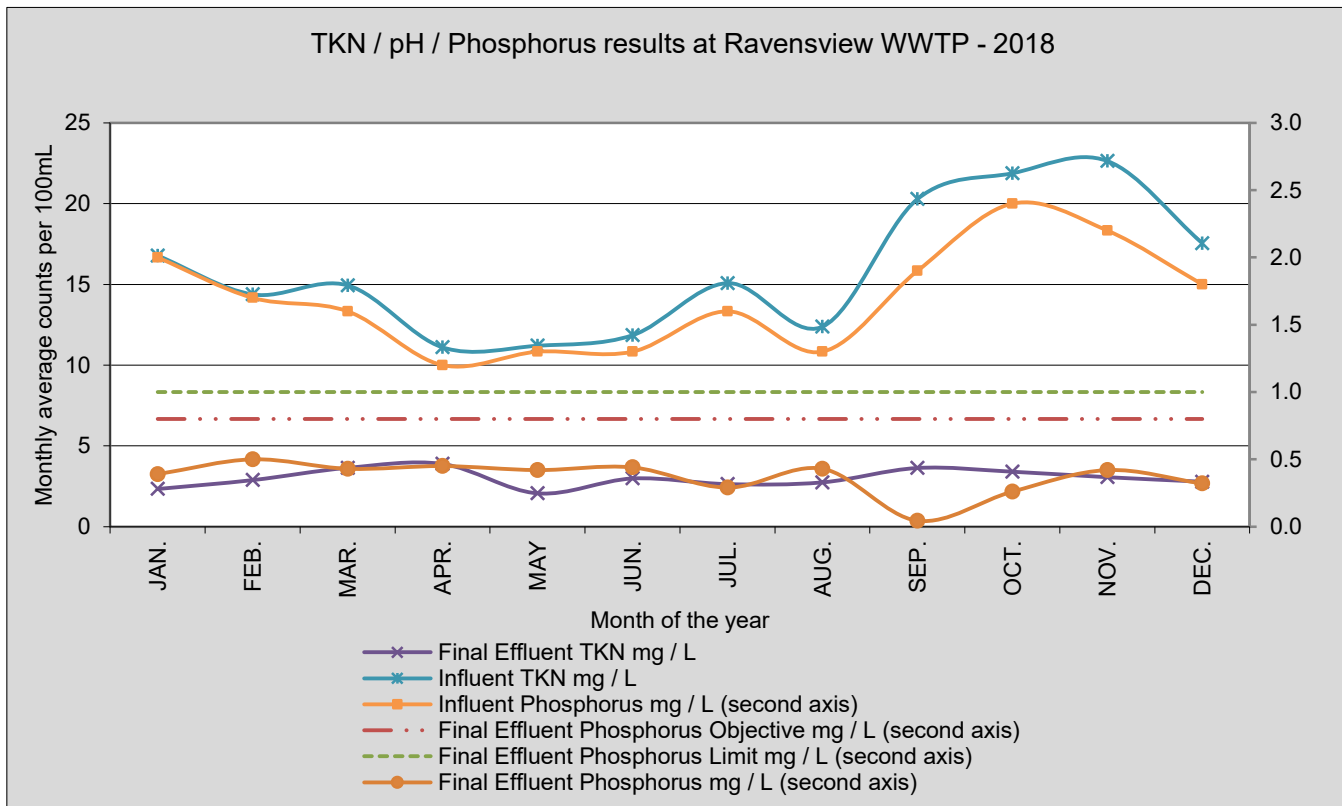
## 2018 ANNUAL REPORT

### Monthly data

Month	Unit	TKN / Influent pH / Phosphorus						
		Influent	Final Effluent	Removal	Influent	Influent	Final Effluent	Removal
		TKN mg / L	TKN mg / L	TKN %	pH	Phosphorus mg / L (second axis)	Phosphorus mg / L (second axis)	Phosphorus %
JAN.		16.78	2.33	86%		2.00	0.39	81%
FEB.		14.38	2.88	80%	7.70	1.70	0.50	71%
MAR.		14.94	3.64	76%	8.02	1.60	0.43	73%
APR.		11.10	3.88	65%	8.10	1.20	0.45	63%
MAY		11.20	2.06	82%	7.94	1.30	0.42	68%
JUN.		11.85	2.98	75%	7.62	1.30	0.44	66%
JUL.		15.08	2.63	83%	7.55	1.60	0.29	82%
AUG.		12.38	2.74	78%	7.80	1.30	0.43	67%
SEP.		20.28	3.63	82%	7.56	1.90	0.04	98%
OCT.		21.88	3.40	84%	7.75	2.40	0.26	89%
NOV.		22.64	3.06	86%	7.65	2.20	0.42	81%
DEC.		17.55	2.78	84%	7.73	1.80	0.32	82%
Average		15.84	3.00	80%	7.77	1.69	0.37	77%
Objective							0.8	
Limit							1.0	



# RAVENSVIEW Wastewater Treatment Plant 2018 ANNUAL REPORT Monthly Graphs





# RAVENSVIEW Wastewater Treatment Plant

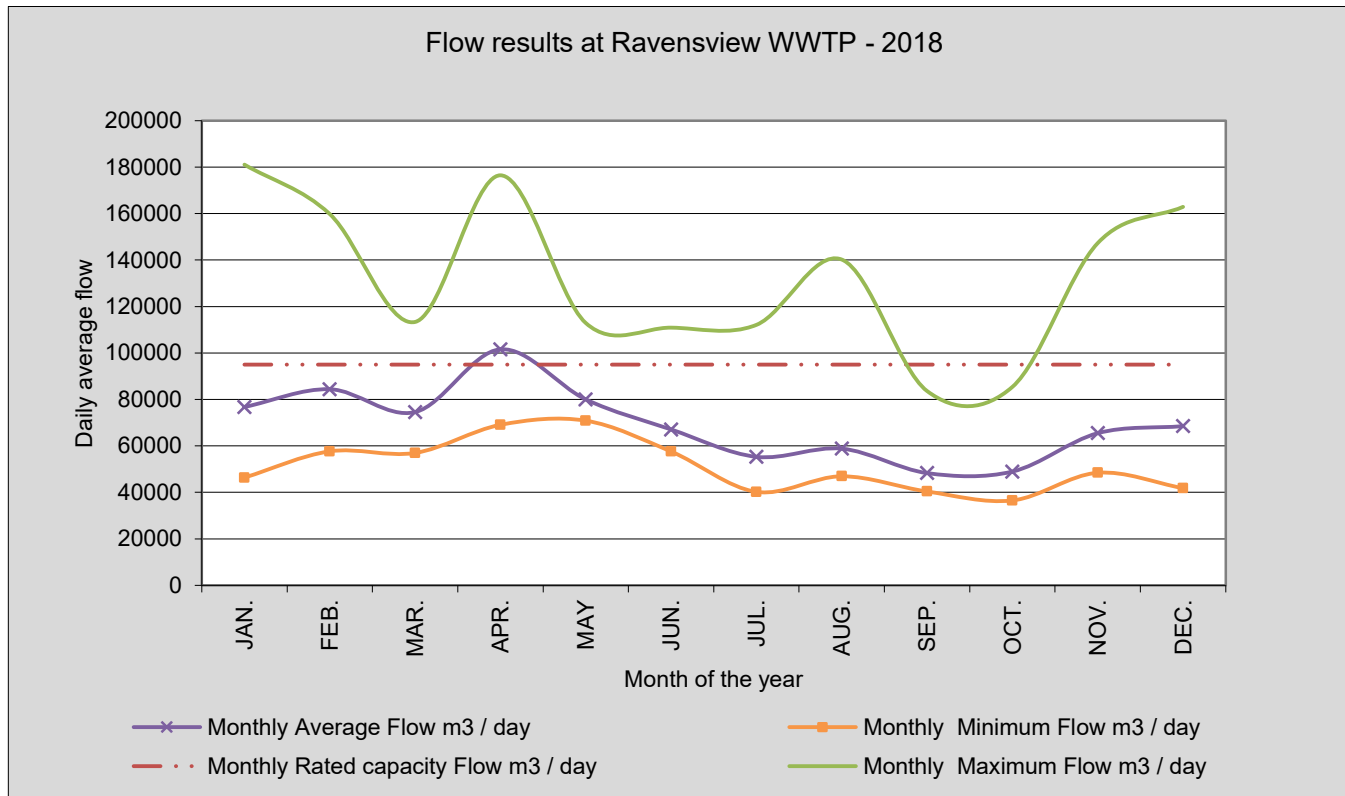
## 2018 ANNUAL REPORT

### Monthly data

Month	Unit	Flows					Monthly Total Grit removal (Estimate) m3 / Month
		Monthly Minimum Flow m3 / day	Monthly Rated capacity Flow m3 / day	Monthly Maximum Flow m3 / day	Monthly Average Flow m3 / day	Monthly Total Flow m3 / Month	
JAN.		46,363	95,000	181,067	76,752	2,379,298	1.5
FEB.		57,673	95,000	159,803	84,405	2,363,333	1.5
MAR.		56,977	95,000	113,361	74,552	2,311,125	1.5
APR.		69,075	95,000	176,475	101,573	3,047,195	1.5
MAY		70,856	95,000	112,916	80,023	2,480,719	1.5
JUN.		57,587	95,000	110,904	67,090	2,012,699	1.5
JUL.		40,224	95,000	112,102	55,299	1,714,269	1.5
AUG.		46,926	95,000	140,216	58,828	1,823,668	1.5
SEP.		40,386	95,000	83,633	48,302	1,449,072	1.5
OCT.		36,522	95,000	85,398	48,951	1,517,475	1.5
NOV.		48,444	95,000	147,285	65,476	1,964,285	1.5
DEC.		41,803	95,000	162,890	68,504	2,123,630	1.5
Average Objective Limit		51,070	95,000	132,171	69,146	2,098,897	1.5



# RAVENSVIEW Wastewater Treatment Plant 2018 ANNUAL REPORT Monthly Graphs





**CANA**  
**WASTEWATER TREATMENT PLANT**



**2018 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, an outline of anticipated volumes to be generated in the next reporting year
- ✓ Summary of effluent quality assurance or control measures under taken;
- ✓ Summary of any complaints;
- ✓ Summary of all by-passes;
- ✓ A copy of all Notice of Modifications submitted to the Water Supervisor



## EXECUTIVE SUMMARY

ECA # 4021-9WUKDE was issued on July 22, 2015 for the new constructed WWTP plant to replace the 44 year old plant.

Utilities Kingston had previously completed an Environmental Study for solutions to address the aging Cana WWTP in June 2013. The study identified that a new sewage treatment system using SBR (Sequencing Batch Reactor) technology would be the chosen alternative to replace the existing Cana WWTP. The replacement SBR system has incorporated chemical / 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 126.83 m<sup>3</sup>/d in 2018.

We have continued to provide cross training to staff members from other facilities and allow them to increase their knowledge of the new Cana WWTP process.

## 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 existing sewer system via a new 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 15mm 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 sequencing batch reactors (SBR).

### Secondary Treatment Unit

The second operation is the secondary treatment unit which consists of two sequencing batch reactors (SBR). 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. Some of the sludge that collects on the bottom of the tank is pumped out for wasting while the rest goes to the digester unit for further treatment. The process is started over again. Each tank operates at a different time so there is a tank always collecting the raw sewage.

## **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 system**

The chemical dosing system has alum dosing for Phosphorus removal. The alum is injected ahead of a static mixer. There is also a polymer dosing system used for filter aid. The polymer 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 ultra violet disinfection system.

## **Ultra Violet (UV) Disinfection**

There are two UV disinfection units in parallel, each 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 for sludge stabilization and storage that came from the SBR's. The supernatant is returned back to the influent while the sludge is periodically hauled to either Ravensview Wastewater Treatment Plant or Cataraqui Bay Wastewater Treatment Plant in the City of Kingston for further treatment.

## PLANT PERFORMANCE

ECA # 4021-9WUKDE was issued on July 22, 2015 for the new constructed WPCP plant to replace the 44 year old plant. The conditions contained within ECA # 4021-9WUKDE apply to the new WWTP starting in January 2017.

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

**Table 1: Effluent Objective**

Effluent Objectives and Limits		
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	0.1 (Monthly Average)	0.2
Total Ammonia Nitrogen	2.0 (Winter, Oct. to Mar.)	3 Winter
	1.0 (summer, April to Sept.)	2 Summer
E. coli.	100 CFU/100 millilitres	200 CFU/100mL

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

**Table 2: Monthly Average Results**

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	10	0.16	1.38	7.65	5	
February	1	5	0.09	0.34	7.93	1	
March	2	3	0.08	0.55	8.04	0	
April	1	8	0.19	0.24	8.17	1	PASS
May	1	7	0.20	.008	8.23	0	
June	1	5	0.13	0.05	8.19	0	
July	1	3	0.11	0.03	8.16	0	
August	1	6	0.11	0.01	8.09	0	
September	1	3	0.04	0.01	8.11	0	PASS
October	1	4	0.04	0.03	8.18	1	
November	2	5	0.07	0.19	8.06	1	
December	2	4	0.03	0.38	8.04	0	
Annual Average	1.53	5.25	0.11	0.27	8.07	0.75	

**Table 3: Plant Flows**

Flows				
Parameter	2015	2016	2017	2018
Avg. m <sup>3</sup> /day	86.72	90.34	137.67	126.58
Max. m <sup>3</sup> /day	223	275	202.00	189.25
Design. m <sup>3</sup> /day	94.6	94.6	125	125
Peak m <sup>3</sup> /day			200	200
% (daily/design)	91.7%	95.5%	110.14%	101.26%

**Table 4: Surface Water Monitoring**

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>								
11/04/18	1	3	0.05	0.02	0.2	1	8.28	6.6
06/09/18	NO	FLOW						
<b>DOWNSTREAM</b>								
11/04/18	2	3	0.07	0.05	0.9	1	8.23	9
06/09/18	2	3	0.05	0.02	3.7	2	8.06	7

**Table 5: Reportable Bypasses**

Bypasses					
Date	Start	Duration (hrs)	Volume (m3)	Reason	Precip. (mm)
12/01/18	00:10	25	135	Heavy rain	18.8
20/02/18	16:51	23.15	112.71	Snow/rain	26
17/04/18	11:31	12.86	38.93	Heavy rain	30.2
15/08/18	08:30	11.27	41.22	Heavy rain	25.7

**Table 6: Reportable Bypass Sampling**

<b>Bypass Event Sampling Results</b>		
<b>Parameter</b>	<b>Units</b>	<b>CANA STP Annual Avg.</b>
E coli	Cfu/100mL	2629
CBOD5	mg/l	5.25
TSS	mg/l	47.25
TP	mg/l	1.53
Total Ammonia	mg/l	0.24

## **OPERATING PROBLEMS**

Modifications to the process piping and changing out of check valves helped to deal with operational challenges experience when the plant first came online in 2017. Staff continued to optimize the plant processes to ensure continuous, reliable operations.

## **SLUDGE GENERATED**

There were 3 loads (total volume of 185 m<sup>3</sup>) of sludge collected and brought to Ravensview Wastewater Treatment Plant. The sludge was discharged at the septage facility. There will be approximately the same amount of sludge removed in 2019.

## **MAINTENANCE**

In 2018 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
- Replaced two check valves
- Analyzer relocation

## **CAPITAL WORKS**

There were no capital works done in 2018 as the plant is newly constructed.

## **OPERATIONS**

Preventative maintenance and regular process and equipment inspections lead to operational problems being diagnosed quickly and corrective actions implemented 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 have been no official complaints about the CANA Wastewater Treatment Plant operations for the reporting year 2018.

## **BYPASS**

There have been four bypasses for the CANA Wastewater Treatment Plant operations for the reporting year 2018 (please see Tables 5 and 6).



## **2018 ANNUAL REPORT**

# **River St. Pumping Station, Collingwood CSO and Orchard CSO**





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## REPORT CHECK LIST

Annual report submitted for River St. Pumping Station certificate of approval 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 or blinded, resulting in emergency overflow. (River St. Pumping Station only)
- Any other information the District Manager requires from time to time.

## EXECUTIVE SUMMARY

The River St. Pumping Facility operates under a Ministry of the Environment, Conservation and Parks Certificate of Approval, #3237-9EFN85. For the reporting year 2018 the facility was in compliance with all conditions outlined in condition 7 of the above mentioned Certificate of Approval and are briefly described in the following sections of this report.

The total flow through the facility in 2018 was 21,839,808 m<sup>3</sup>.

The facility saw no bypass events in the 2018 reporting year therefore no debris has clogged the overflow screen. It is still visually inspected from time to time.

Two pumps were changed out and rebuild as well as an overhaul of the screening system including the rebuild of the compactor gearbox and rebuild of the upper and lower screen bearings. Infrared scans on HV electrical and routine vibration monitoring was also done this year.

The facility was upgraded in 2013 and finished 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 2018 was 108,522.1 m<sup>3</sup> with no bypasses occurring.

No repairs had to be done to this system in 2018 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 2018 was 225,039.2 m<sup>3</sup>.  
The total flow to the Lake was 71,622.3 m<sup>3</sup> during bypasses.

There were 6 bypass events from this system in 2018. Please see Table 1 & 2.

The holding tank was cleaned out this year to remove collected debris.

## EQUIPMENT CALIBRATIONS

All of 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.

## COMPLAINTS

There have been no official complaints about all three facilities for the year 2018.

## BYPASS SUMARRY

Table 1 summarizes the locations, volumes and durations of bypass events for the reporting year 2018. There were no bypasses from River St. Pumping Station and Orchard St. CSO. Table 2 summarizes the test results from samples taken during the 2018 bypass events.

**Table 1: Bypass Events**

<b>Bypass Event Record</b>						
<b>Date mm/dd/yyyy</b>	<b>Location</b>	<b>Start Time</b>	<b>End Time</b>	<b>Volume (m<sup>3</sup>)</b>	<b>Reason For Bypass</b>	<b>Precip (mm)</b>
<b>01/11/2018 – 01/13/2018</b>	<b>King- Collingwood CSO</b>	<b>22:35</b>	<b>6:10</b>	<b>40614.75</b>	<b>Heavy rain/rapid snow melt</b>	<b>38.1</b>
<b>02/20/2018 – 02/22/2018</b>	<b>King- Collingwood CSO</b>	<b>9:38</b>	<b>00:20</b>	<b>35691.13</b>	<b>Heavy rain/rapid snow melt</b>	<b>26.1</b>
<b>04/18/2018</b>	<b>King- Collingwood CSO</b>	<b>21:30</b>	<b>22:00</b>	<b>311.55</b>	<b>Prolonged rain</b>	<b>30.3</b>
<b>08/15/2018</b>	<b>King- Collingwood CSO</b>	<b>16:45</b>	<b>2:02</b>	<b>6350.25</b>	<b>Multiple thunderstorms</b>	<b>79.8</b>
<b>12/21/2018</b>	<b>King- Collingwood CSO</b>	<b>5:00</b>	<b>9:27</b>	<b>771.5</b>	<b>Heavy rain</b>	<b>65.7</b>
<b>12/21/2018 – 12/22/2018</b>	<b>King- Collingwood CSO</b>	<b>18:18</b>	<b>17:35</b>	<b>17288.75</b>	<b>Heavy rain</b>	<b>65.7</b>

**Table 2: Bypass Sampling Results**

Bypass Event Sampling Results For Collingwood CSO		
Parameter	Units	King- Collingwood CSO Annual Avg.
Total Coliform	Cfu/100ml	986482
E coli	Cfu/100ml	122270
HPC	Cfu/ml	328849
CBOD <sub>5</sub>	mg/l	14
TSS	mg/l	53
TP	mg/l	0.68
TKN	mg/l	4.9

**BYPASS RESULT INTERPRETATIONS**

All bypass discharges have a higher bacteria count due to no disinfection occurring. CBOD<sub>5</sub>, TP & TKN results are much lower than typical raw sewage influent to the sewage plant due to the dilution of rain water during these events.

All efforts are made to contain any debris 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.