

# Coboconk Sewage Lagoons

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Works # 120002353

## Annual Wastewater Performance Report

Prepared For: The City of Kawartha Lakes

Reporting Period of January 1<sup>st</sup> – December 31<sup>st</sup>, 2020

Issued: March 16, 2021

Revision: 0

Operating Authorities:



### **2020 Performance Report for Coboconk Sewage Lagoons**

The Coboconk Sewage Lagoons is a dual lagoon system with continuous phosphorus removal using aluminum sulphate, and seasonal effluent discharges. The discharge window in the spring is April 1 to May 31 and in the fall is November 1 to December 31.

The Coboconk Sewage Lagoons operate under Amended Environmental Compliance Approval (ECA) #9527-AHVRDY issued March 17, 2017. Condition 11 (5) Reporting of the ECA requires the following:

The Owner shall prepare and submit to the Water Supervisor a performance report, on an annual basis, within ninety (90) days following the end of the period being reported upon. The first such report shall cover the first annual period following the commencement of operation of the Works and subsequent reports shall be submitted to cover successive annual periods following thereafter. The reports shall contain, but shall not be limited to, the following information:

- (a) a 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;
- (b) a summary and interpretation of all effluent plume monitoring data and effluent discharge impact assessment to Gull River
- (c) tabulation of calculated un-ionized ammonia concentrations in final effluent, based on Total Ammonia Nitrogen concentrations, temperature and pH of final effluent;
- (d) tabulation of daily flow rates and monthly volumes including average daily flows for discharge periods reported;
- (e) a summary of all Bypass, spill or abnormal discharge events;
- (f) an overview of the sludge disposal program, including tabulation of quantity and quality of sludge and the disposal areas used for each sludge source during the reporting period, together with an outline of the proposed sludge handling method and disposal areas to be utilized over the next reporting period;
- (g) a description of any operating problems encountered and corrective actions taken;
- (h) a description of efforts made and results achieved in meeting the Effluent Objectives of Condition 6
- (i) a summary of any complaints received during the reporting period and any steps taken to address the complaints;
- (j) a copy of all Notice of Modifications submitted to the Water Supervisor as a result of Schedule B, Section 1, with a status report on the implementation of each modification;
- (k) a report summarizing all modifications completed as a result of Schedule B, Section 3; and
- (l) any other information the Water Supervisor may require from time to time.

During the period of 2020, the Ontario Clean Water Agency (OCWA) operated the Coboconk Sewage Lagoons on behalf of the Corporation of the City of Kawartha Lakes. OCWA's goals have remained consistent during this period and remain consistent with the following priorities:

- provide quality assurance, safety and environmental compliance of facility operations;
- assist our clients in achieving compliance;
- provide advice on up-to-date technology in Operations and Maintenance service delivery.

This report will show that the Ontario Clean Water Agency has made every attempt to achieve its goals through its operational performance. This performance was enhanced through the use of an electronic process data collection database, an electronic maintenance and work order database, an electronic operational excellence database, a training program focused on providing the right skills to staff - also captured and tracked by the use of an electronic database and a multi-skilled, flexible workforce.

This report will show that the requirements of the facility ECA including effluent monitoring, effluent plume monitoring and reporting requirements were consistently met and that effluent quality was consistently within ECA requirements.

**Table 1. Coboconk Sewage Lagoons – Effluent Compliance Limits – 2020 Discharges**

<b>Table 1.</b>							
Effluent Parameter (Column 1)	Concentration (mg/L unless otherwise indicated) (Column 2) Discharge Sample Dates	Concentration (mg/L)	Compliant (Y/N) Waste Loading	(kg/d unless otherwise indicated) (Column 3)	Waste Loading	(kg/d)	Compliant (Y/N)
<b>Spring May 5 - 10</b>							
CBOD5	25.0 (average per discharge)	May 5-10	<2.0	Y	231.0	<13.8	Y
Total Suspended Solids	25.0 (average per discharge)	May 5-10	3.3	Y	231.0	23.0	Y
Total Phosphorus	0.5 (average per discharge)	May 5-10	<0.03	Y	4.62	<0.21	Y
Total Ammonia Nitrogen Spring (Apr 1 to May 31)	15.0 (daily limit)	May 5 May 8 May 10	5.0 4.3 3.9	Y Y Y	139.0	30.5 37.8 1.0	Y Y Y
Hydrogen Sulphide	0.1 (daily limit)	May 5 May 8 May 10	<0.02 <0.02 <0.02	Y Y Y	0.92	0.12 0.18 0.01	Y Y Y
pH	6.0 to 9.5 at all times	May 5 May 8 May 10	8.16 8.17 8.11	Y Y Y	-	-	-
<b>Fall November 17 - 21</b>							
CBOD5	25.0 (average per discharge)	Nov 17-21	<2.0	Y	231.0	<15.3	Y
Total Suspended Solids	25.0 (average per discharge)	Nov 17-21	4.0	Y	231.0	30.7	Y
Total Phosphorus	0.5 (average per discharge)	Nov 17-21	<0.04	Y	4.62	<0.33	Y
Total Ammonia Nitrogen Fall (Nov 1 to Dec 31)	8.0 (daily limit)	Nov 17 Nov 20 Nov 21	2.8 2.8 2.8	Y Y Y	74.0	16.7 24.8 16.2	Y Y Y

Hydrogen Sulphide	0.1 (daily limit)	Nov 17	<0.02	Y	0.92	0.12	Y
		Nov 20	<0.02	Y		0.18	Y
		Nov 21	<0.02	Y		0.12	Y
pH	6.0 to 9.5 at all times	Nov 17	8.12	Y	-	-	-
		Nov 20	8.18	Y			
		Nov 21	8.14	Y			

**(a)** Attached as Appendix I is the Performance Assessment Report (PAR) and as Appendix II is the Lagoon Discharge Report. These reports summarize flows and monitoring data for 2020. During the reporting period all effluent quality was below the Effluent Limits set in the ECA. These results are indicative of the facility's ability to adequately treat the sewage it receives. The following table summarizes the effluent parameters with limits and 2020 effluent results for each discharge.

*Note:*

*For the purposes of determining compliance with and enforcing subsection (1):*

*(a) The Seasonal Average Concentration of CBOD<sub>5</sub>, Total Suspended Solids and Phosphorus named in Column 1 of subsection (1) shall not exceed the corresponding maximum concentration set out in Column 2 of subsection (1).*

*(b) The Seasonal Average Loading of CBOD<sub>5</sub>, Total Suspended Solids and Phosphorus named in Column 1 of subsection (1) shall not exceed the corresponding maximum concentration set out in Column 2 of subsection (1).*

*(c) The Daily Concentration of Total Ammonia Nitrogen and Hydrogen Sulphide named in Column 1 of subsection (1) shall not exceed the corresponding maximum concentration set out in Column 2 of subsection (1).*

*(d) The Daily Loading of Total Ammonia Nitrogen and Hydrogen Sulphide named in Column 1 of subsection(1) shall not exceed the corresponding maximum waste loading set out in Column 3 of subsection (1).*

*(e) The pH of the effluent shall be maintained within the limits outlined in subsection (1), at all times.*

The ECA requires one grab sample to be collected on the first day of a discharge, every third calendar day of the discharge and on the last day of the discharge. The discharge windows are April 1 to May 31 which is the Spring Discharge, and November 1 to December 31 which is the Fall Discharge. Each window allows a maximum period of 14 days at a discharge flow rate not exceeding 9,245m<sup>3</sup>/day.

The results in Table 1 show that the effluent concentrations and the waste loadings of cBOD<sub>5</sub>, total suspected solids, total phosphorus, Total Ammonia Nitrogen and Hydrogen Sulphide were in compliance with the ECA. The pH of the effluent was maintained within the limits and compliant at all times.

Additionally, ECA Effluent Limits, (3) states "...the monthly Geometric Mean Density of *E. Coli* does not exceed 200 organisms per 100 milliliters of effluent discharged..."

Many wastewater treatment facilities must test for and report results using a 'Geometric Mean' (average) of all the test results obtained during a specific reporting period. The geometric mean calculation is different than a normal arithmetic mean (average) calculation and is considered to be a more accurate calculation. A geometric mean, unlike an arithmetic mean, tends to dampen the effect of very high or low values which might bias the mean if a straight average (arithmetic mean) were calculated.

Table 2 provides monthly geometric mean density values of E.Coli in the Coboconk Lagoon effluent for each month that a discharge occurred in 2020.

**Table 2. Cobconk Sewage Lagoon – Effluent E. coli Results for 2020 (org/100mL)**

Seasonal Discharge Month	May	Nov
Monthly Geometric Mean Density of E. Coli	1.59	1.59
Compliant with Limit of 200 org/100 mL (Y/N)	Y	Y

Total Kjeldhal Nitrogen (TKN) was also sampled in the effluent and results ranged from 5.4 – 7.2mg/L during the spring discharge periods and 3.2 – 3.3mg/L during the fall discharge period.

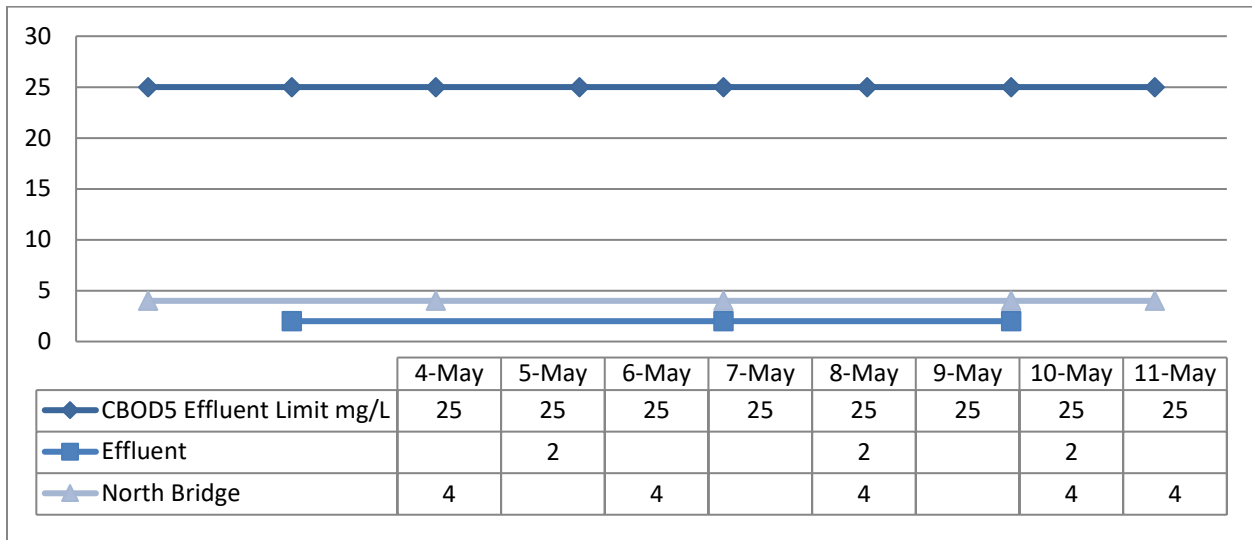
**(b)** An Effluent Plume Monitoring Program is conducted during each seasonal discharge period to assess the dilution effect of the sewage effluent discharged to the Gull River. Samples are collected from the North Bridge and Dam Centre Sluice and analyzed for CBOD5, Total Suspended Solids (TSS), Total Phosphorus (TP), Total Ammonia Nitrogen (TAN), Total Kjeldahl Nitrogen (TKN), Hydrogen Sulphide, pH and Temperature. The ECA requires a grab sample be collected one day prior to the seasonal effluent discharge period, every other day during the effluent discharge period, and one day following the end of the seasonal discharge period.

In 2019-20 the Trent Severn Waterway undertook construction work on the dam in Coboconk preventing access to the Dam Centre Sluice sampling location in 2019 and Spring 2020. The Peterborough District MECP (Ministry of the Environment Conservation and Parks) was contacted to discuss an alternate sampling location which was sampled in 2019. In 2020 MECP indicated that the alternate location was not required for 2020 as the North Bridge was sufficient at that time. Trent Severn Waterway construction was completed prior to the fall of 2020 and the Dam Centre Sluice location was accessible.

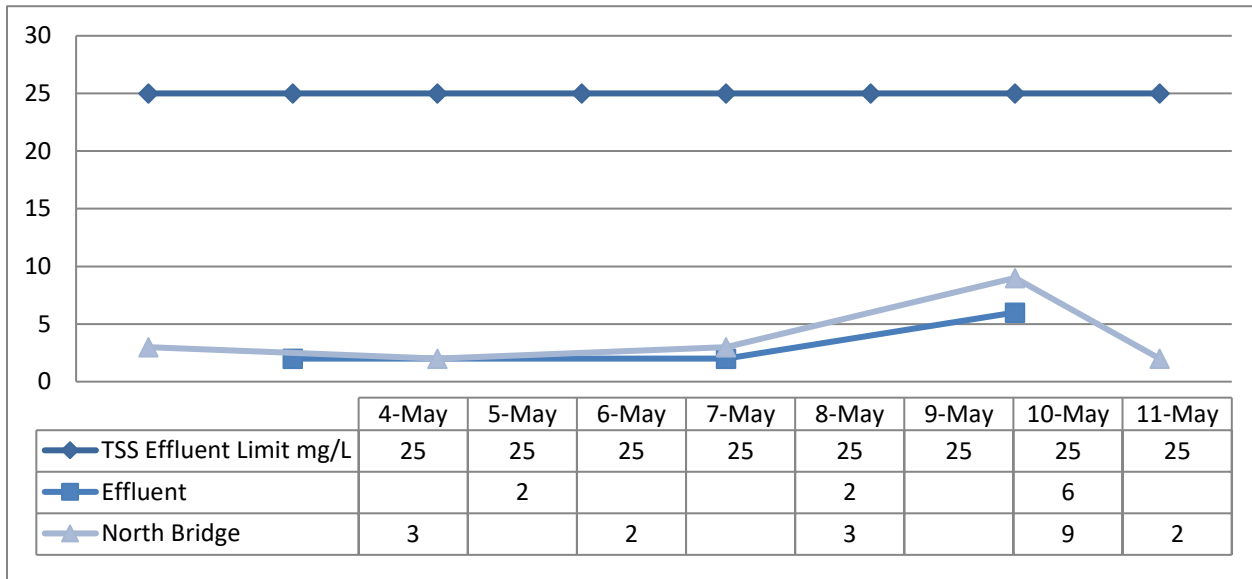
Spring discharge occurred May 5 to 10, 2020. Fall discharge occurred November 17 to 21, 2020. Results for the effluent, North Bridge and Centre Sluice Dam are presented in the following graphs and tables for each Effluent Plume Monitoring parameter.

Spring Discharge – May 5 to 10, 2020

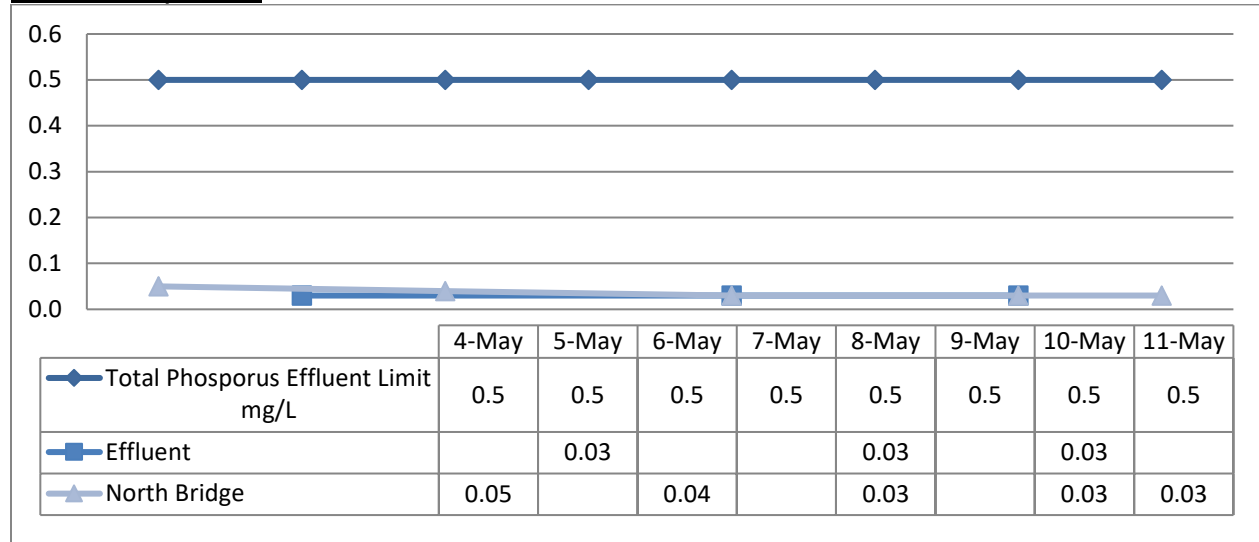
### CBOD5



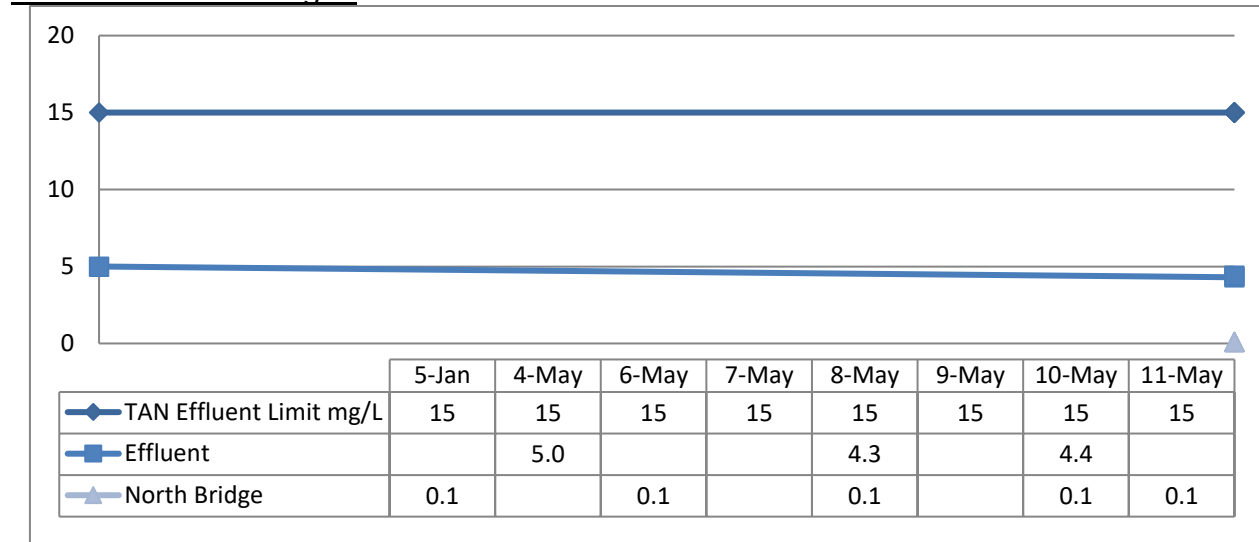
Total Suspended Solids



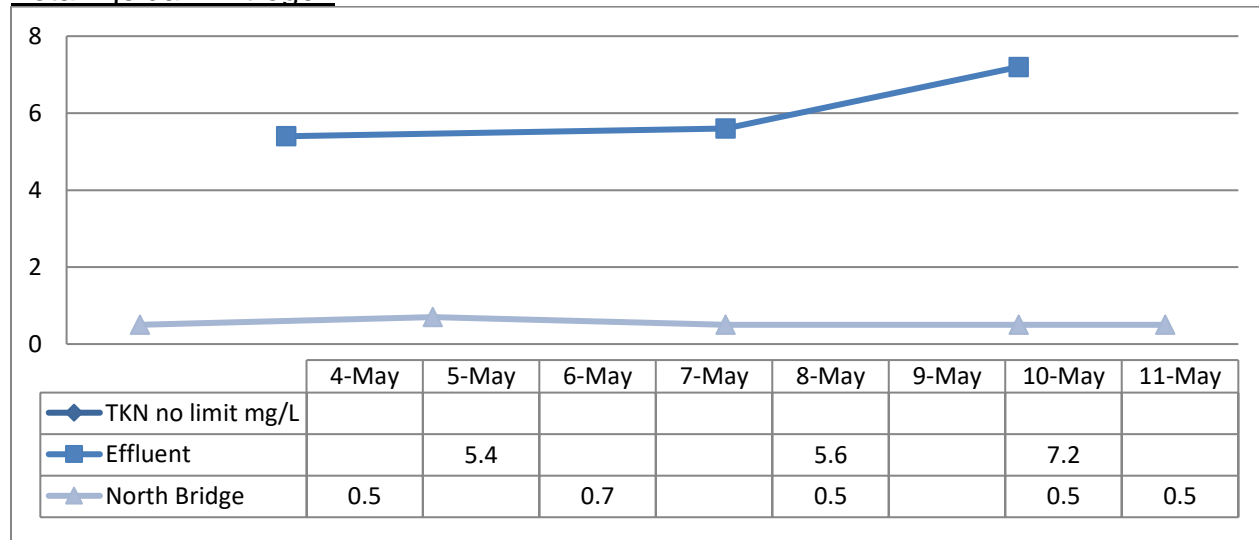
**Total Phosphorus**



**Total Ammonia Nitrogen**

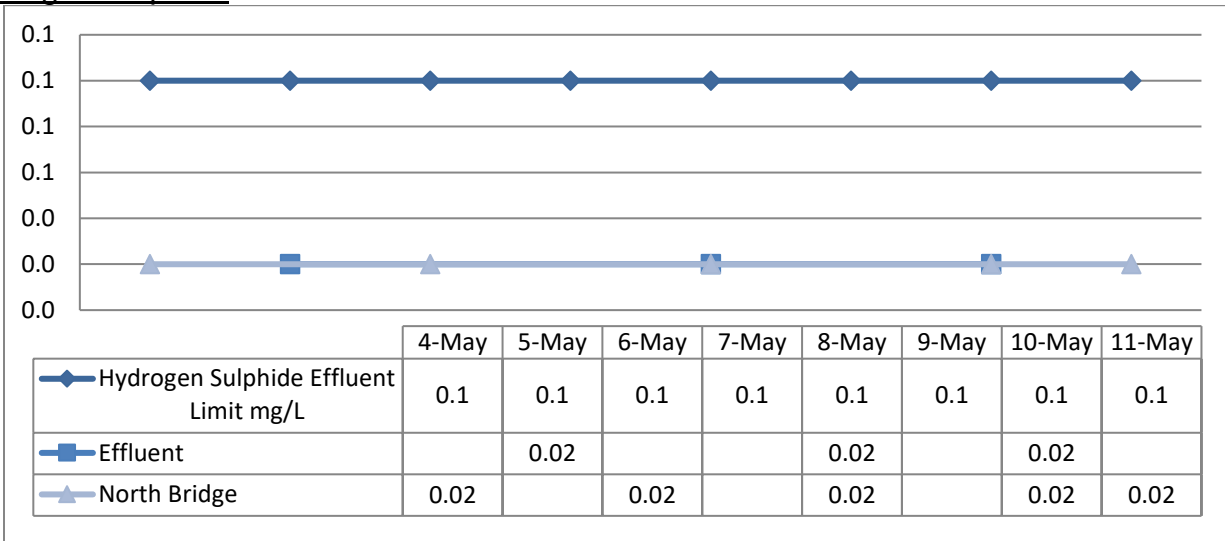


**Total Kjeldahl Nitrogen**

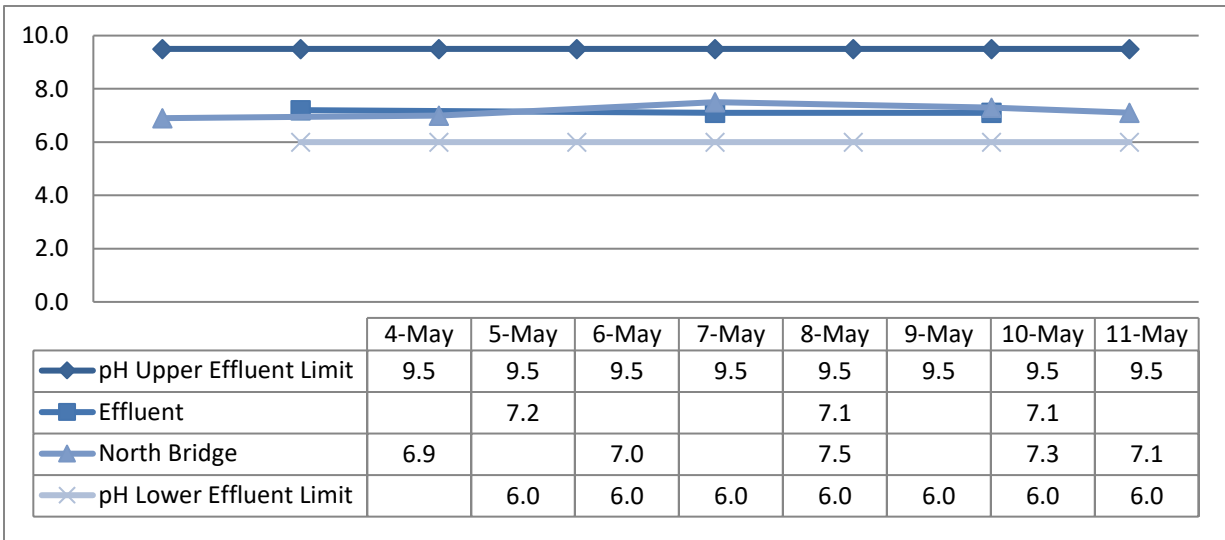




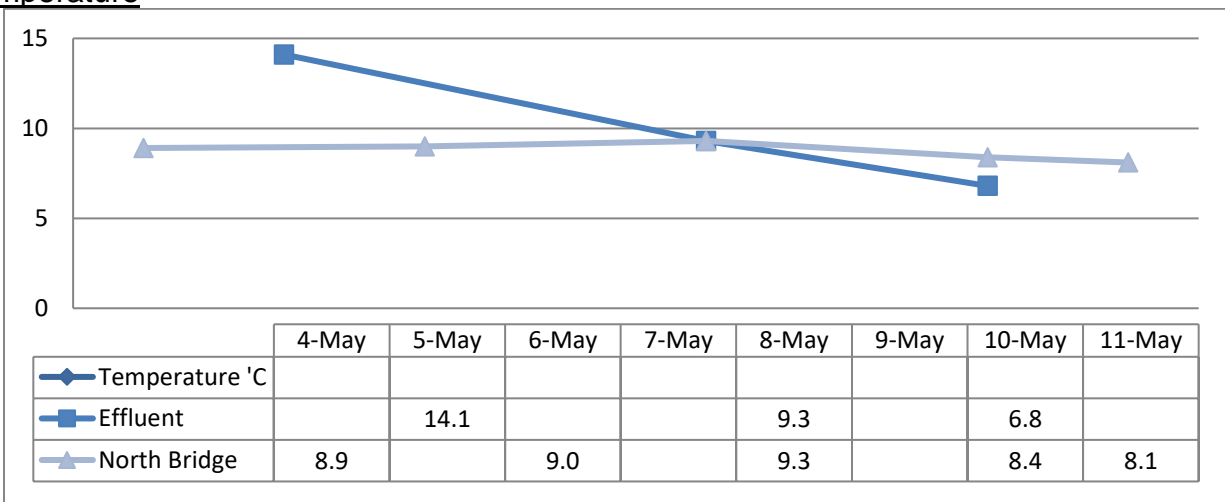
Hydrogen Sulphide



pH

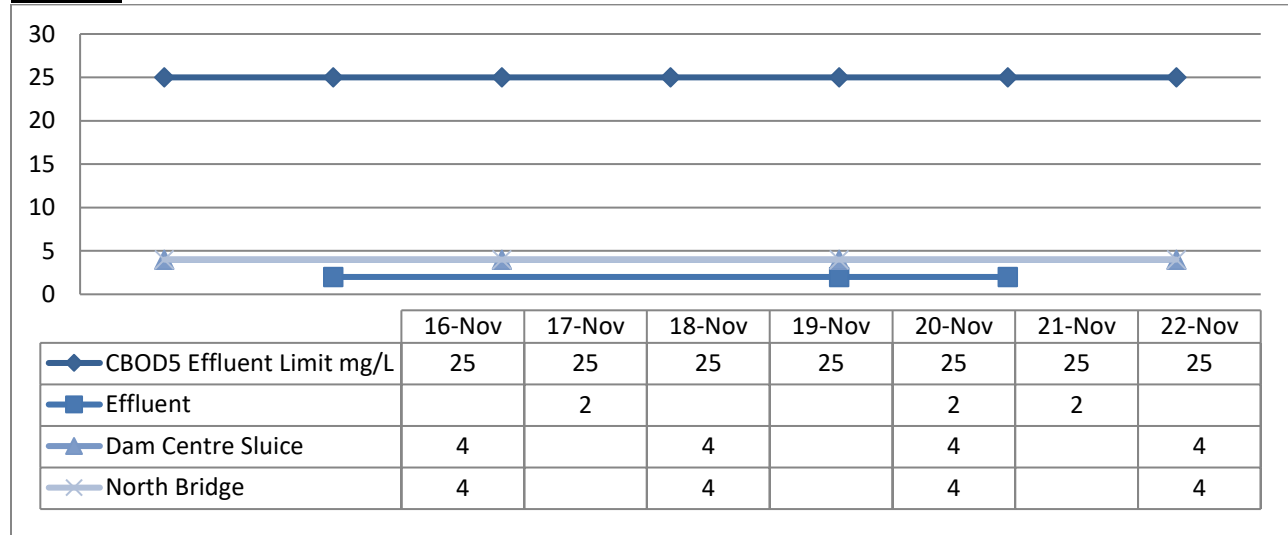


Temperature

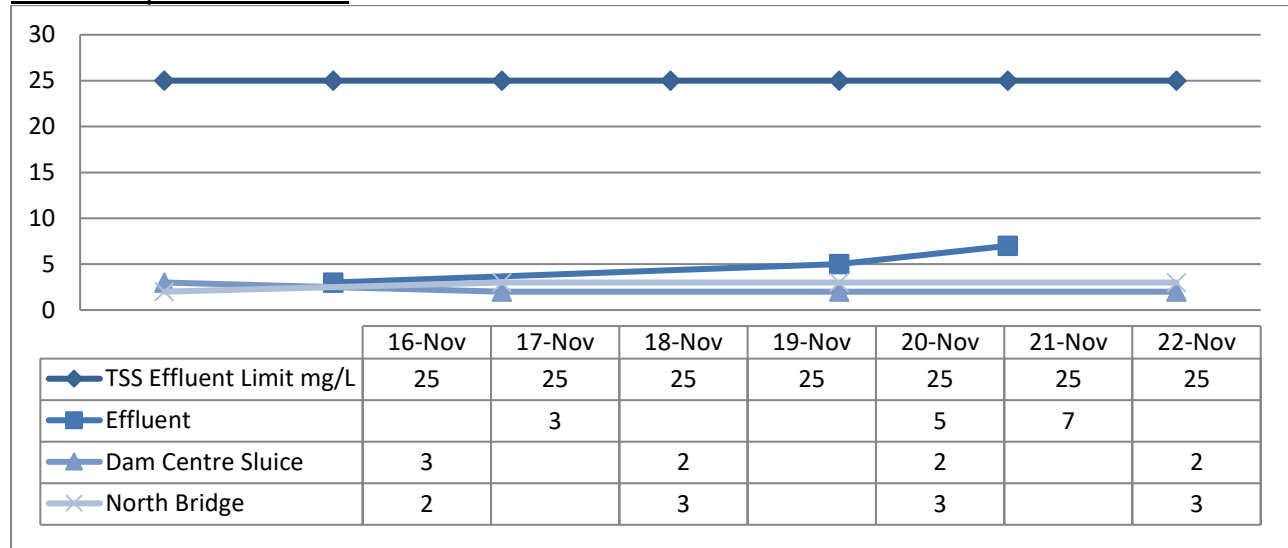


Fall Discharge – November 17 to 21, 2020

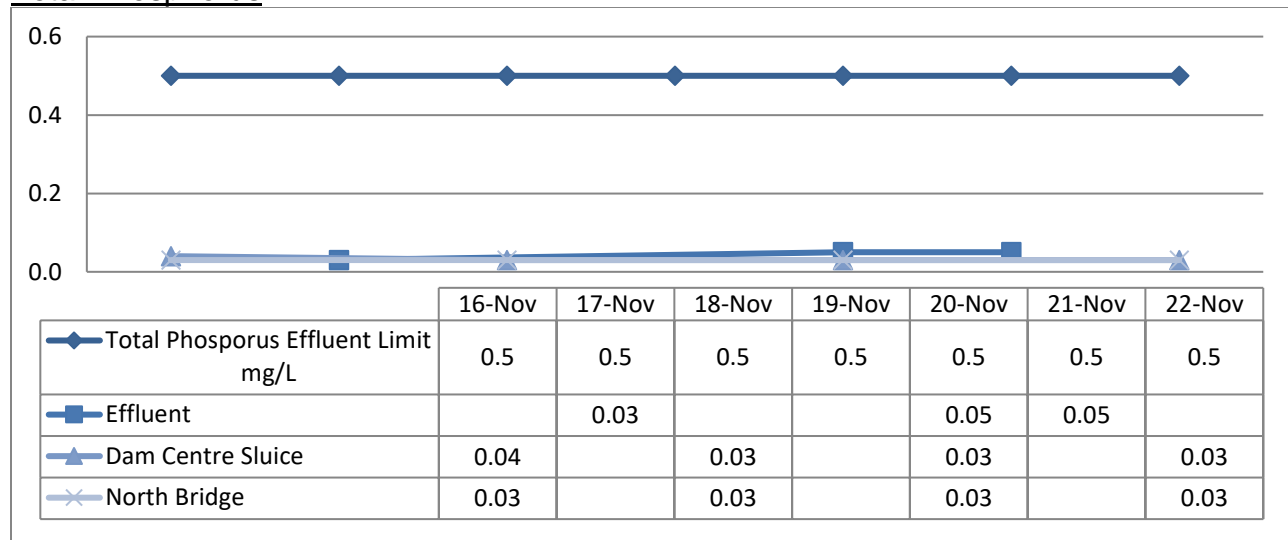
**CBOD5**



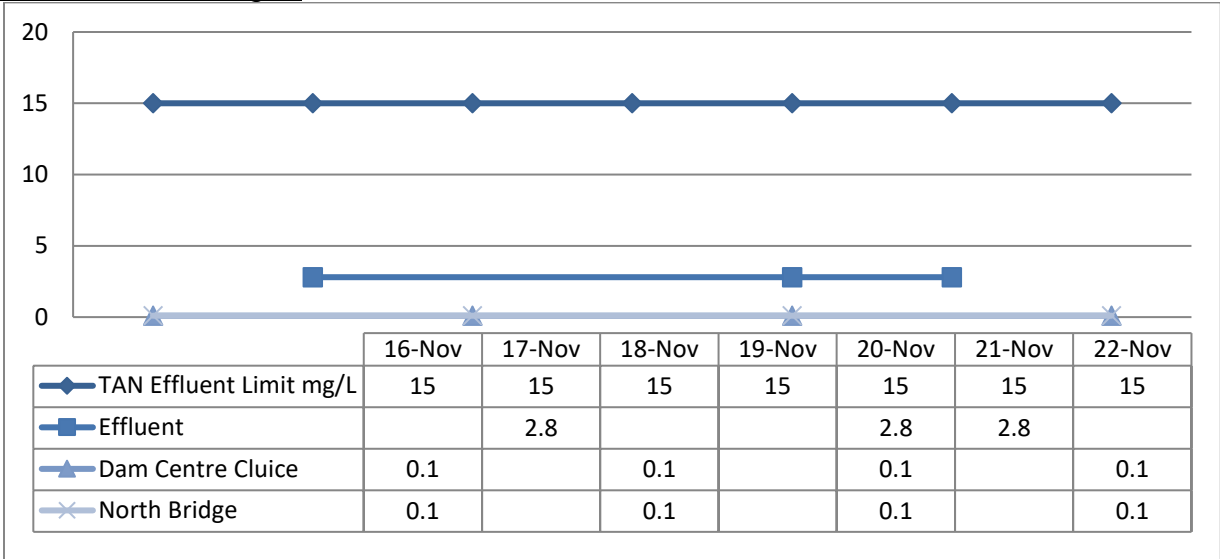
**Total Suspended Solids**



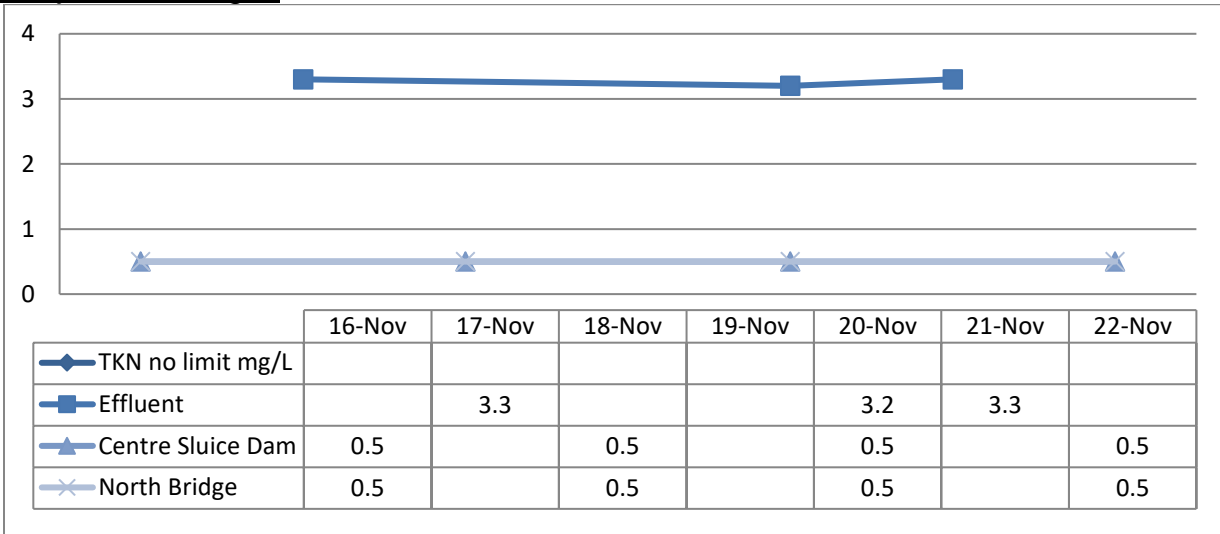
**Total Phosphorus**



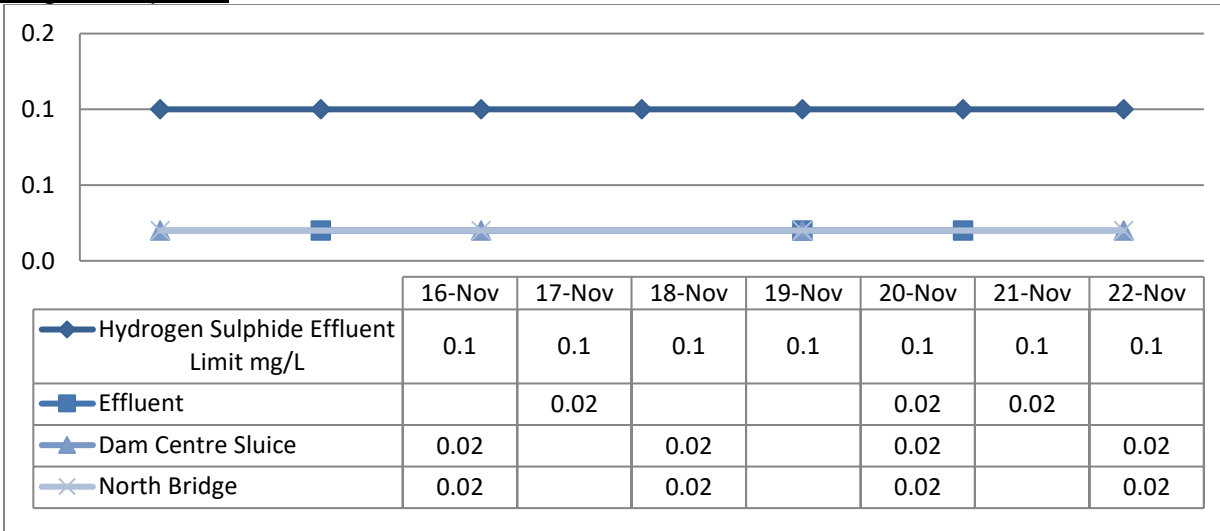
Total Ammonia Nitrogen



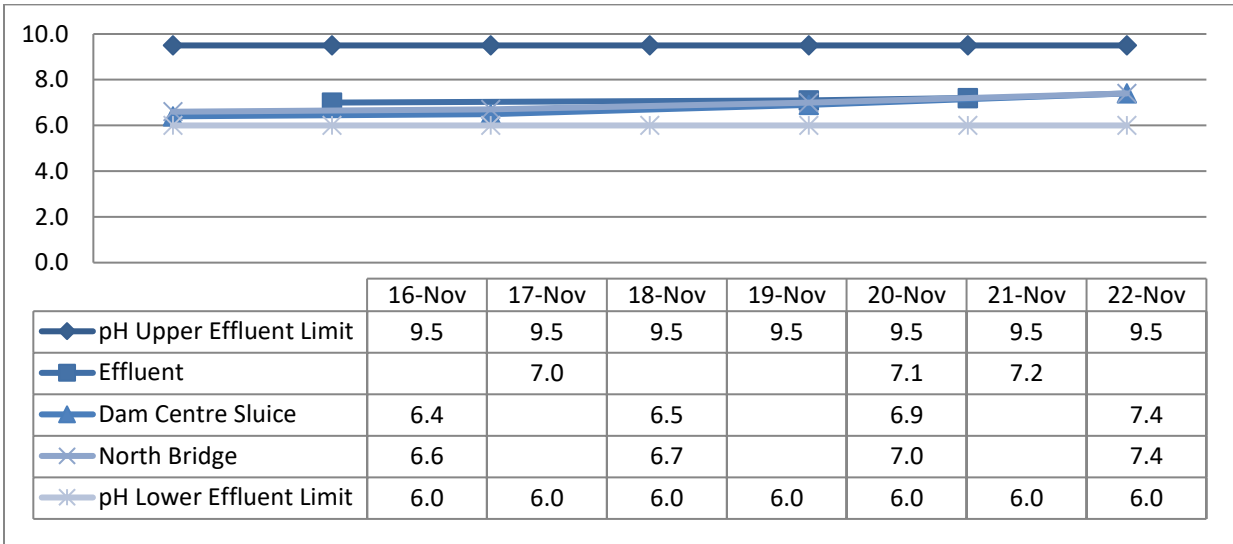
Total Kjeldahl Nitrogen



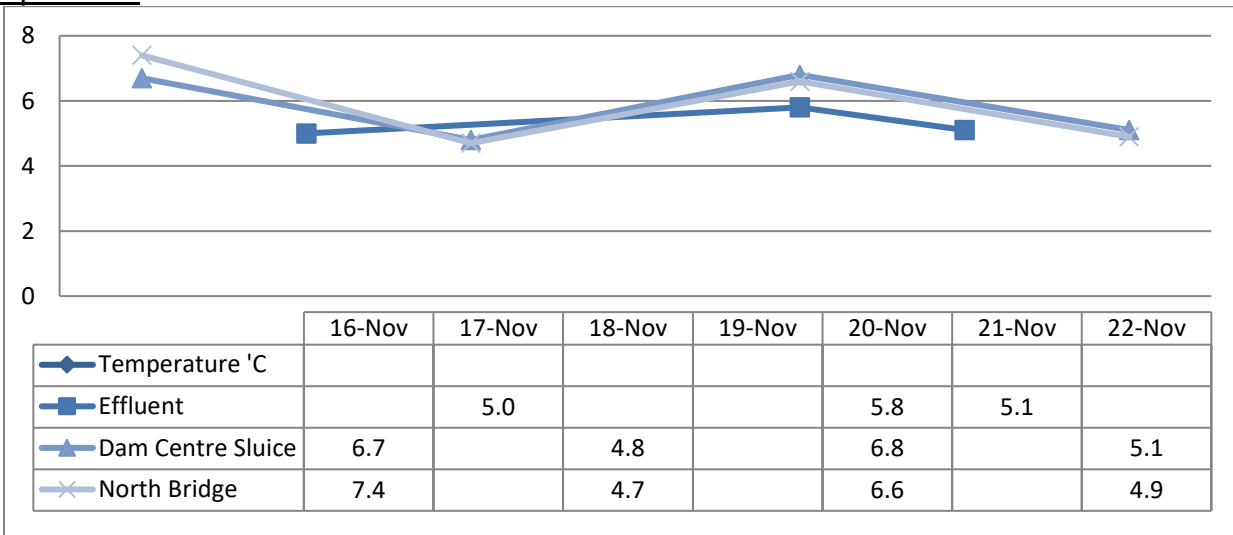
Hydrogen Sulphide



pH



Temperature



These results suggest that, for the parameters analyzed, the effluent discharges have had little to no impact on the water quality of the Gull River in 2020.

(c) Condition 9 (7) requires the temperature and pH of the effluent be determined in the field at the time of sampling for TAN. The concentration of un-ionized ammonia shall be calculated using the TAN concentration, pH and temperature using the methodology stipulated in “Ontario’s Provincial Water Quality Objective” dated July 1994, as amended, for ammonia (un-ionized). Table 3 provides a tabulation of the Coboconk Sewage Lagoon Effluent Un-ionized Ammonia Results for 2020.

Table 3. Coboconk Lagoon Effluent Un-ionized Ammonia Results for 2020

Date	Total Ammonia Nitrogen (mg/L)	Field Temperature (°C)	Field pH	Unionized Ammonia (mg/L)
May 5	5.0	14.1	7.2	0.019
May 8	4.3	9.3	7.1	0.009
May 10	3.9	6.8	7.1	0.008
Nov 17	2.8	5.0	7.0	0.003
Nov 20	2.8	5.8	7.1	0.004
Nov 21	2.8	5.1	7.2	0.005

(d) The facility is operated on a semi-annual discharge basis with the effluent discharge commencing no earlier than April 1 or terminating not later than May 31 in spring (Spring Effluent Discharge Period) and not earlier than November 1 or terminating not later than December 31 in the fall (Fall Effluent Discharge Period). Each period is allowed a maximum of 14 days at a discharge flow rate not exceeding 9,245m<sup>3</sup>/day. Tables 4 and 5 show the effluent discharges were compliant with the Spring and Fall Effluent Discharge Periods, number of discharge days and the discharge flow rate.

#### Seasonal Discharge Flows per Discharge Period

Table 4: Spring Effluent Discharge Period April 1 to May 31

Date	Flow Limit m <sup>3</sup> /day	Flow (m <sup>3</sup> /day)	Compliant Y/N	# Days / Discharge Limit	# of Days of Discharge	Compliant Y/N
May 5	9,245	6,105.4	Y	14	6	Y
May 6	9,245	8,814.0	Y	14	6	Y
May 7	9,245	8,812.3	Y	14	6	Y
May 8	9,245	8,781.3	Y	14	6	Y
May 9	9,245	8,620.7	Y	14	6	Y
May 10	9,245	265.3	Y	14	6	Y

Total volume of effluent discharged in the Spring of 2020 was 41,399m<sup>3</sup>.

Table 5: Fall Effluent Discharge Period November 1 to December 31

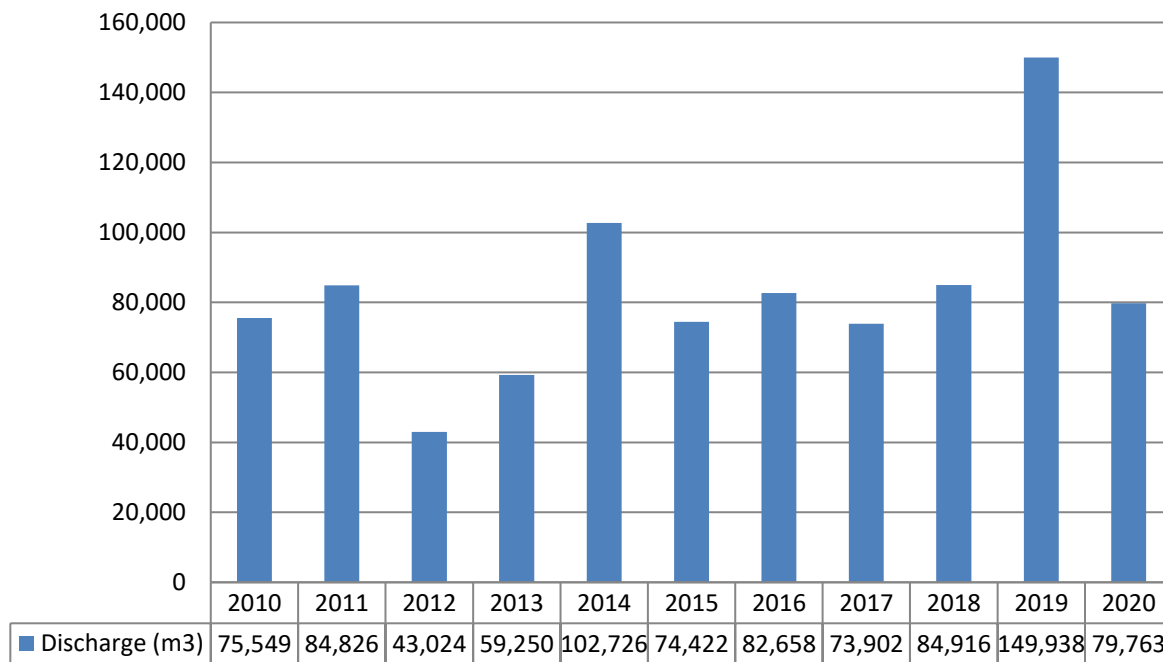
Date	Flow Limit m3/day	Flow (m3/day)	Compliant Y/N	# Days / Discharge Limit	# of Days of Discharge	Compliant
Nov 17	9,245	5946.9	Y	14	5	Y
Nov 18	9,245	8873.2	Y	14	5	Y
Nov 19	9,245	8890.5	Y	14	5	Y
Nov 20	9,245	8853.0	Y	14	5	Y
Nov 21	9,245	5800.3	Y	14	5	Y

Total volume of effluent discharged in the Fall of 2020 was 38,364m<sup>3</sup>.

The total volume of effluent discharged from the Coboconk Sewage Lagoons is 149,802m<sup>3</sup>.

The following chart provides the annual total discharge flow from the Coboconk Sewage Lagoons since 2010.

Annual Total Discharge Flow Comparison



The total discharge effluent flows from the Coboconk Sewage Lagoons have been relatively consistent in recent years however 2019 experienced an increase. Weather conditions have an impact on the amount of effluent discharged each year. Evaporation due to high temperatures and strong winds can lower the volumes while heavy precipitation periods can increase the total effluent discharged.

(e) No Bypasses, Overflows, spills or abnormal discharge events occurred in 2020.

(f) A sludge disposal program took place at the Coboconk Sewage Lagoons from October – November 29, 2012 with all 5,888.8m<sup>3</sup> of sludge being removed from the south cell and disposed of via field application. No sludge was removed in 2020 and nothing is planned for 2021.

(g) No operating problems occurred in 2020.

Appendix III (attached) outlines scheduled and corrective maintenance completed throughout 2020.

Table 6 Coboconk Sewage Lagoon Effluent Objectives summarizes the results for the parameters tested.

**Table 6: Coboconk Sewage Lagoon – Effluent Objectives – 2020 Discharges**

Effluent Parameter	Concentration Objective (mg/L unless otherwise indicated)	Discharge Sample Dates	Concentration (mg/L)	Objective Met (Y/N)	Waste Loading (kg/d unless otherwise indicated)	Waste Loading (kg/d)	Objective Met (Y/N)
<b>Spring May 5 - 10</b>							
CBOD5	15.0 (average per discharge)	May 5-10	<2.0	Y	139.0	<13.8	Y
Total Suspended Solids	20.0 (average per discharge)	May 5-10	3.3	Y	185.0	23.0	Y
Total Phosphorus	<0.5 (average per discharge)	May 5-10	<0.03	Y	<4.62	<0.21	Y
Total Ammonia Nitrogen Spring (Apr 1 to May 31)	10.0 (daily limit)	May 5 May 8 May 10	5.0 4.3 3.9	Y Y Y	92.5	30.5 37.8 1.0	Y Y Y
Hydrogen Sulphide	Absent	May 5 May 8 May 10	<0.02 <0.02 <0.02	Y Y Y	Absent	0.12 0.18 0.01	See note below
pH	6.5 to 8.5 at all times	May 5 May 8 May 10	8.16 8.17 8.11	Y Y Y	-	-	-
E. Coli	200 organisms/100mL	May 5 May 8 May 10	<2 0 <2	Y Y Y	-	-	-
<b>Fall November 17 - 21</b>							

Effluent Parameter	Concentration Objective (mg/L unless otherwise indicated)	Discharge Sample Dates	Concentration (mg/L)	Objective Met (Y/N)	Waste Loading (kg/d unless otherwise indicated)	Waste Loading (kg/d)	Objective Met (Y/N)
CBOD5	15.0 (average per discharge)	Nov 17-21	<2.0	Y	139.0	<15.3	Y
Total Suspended Solids	20.0 (average per discharge)	Nov 17-21	4.0	Y	185.0	30.7	Y
Total Phosphorus	<0.5 (average per discharge)	Nov 17-21	<0.04	Y	<4.62	<0.33	Y
Total Ammonia Nitrogen Fall (Nov 1 to Dec 31)	5.0 (daily limit)	Nov 17 Nov 20 Nov 21	2.8 2.8 2.8	Y Y Y	46.2	16.7 24.8 16.2	Y Y Y
Hydrogen Sulphide	Absent	Nov 17 Nov 20 Nov 21	<0.02 <0.02 <0.02	Y Y Y	Absent	0.12 0.18 0.12	See note below
pH	6.5 to 8.5 at all times	Nov 17 Nov 20 Nov 21	8.12 8.18 8.14	Y Y Y	-	-	-
E. Coli	200 organisms/100mL	Nov 17 Nov 20 Nov 21	<2 <2 0	Y Y Y	-	-	-

Note: For the purpose of calculating loadings for hydrogen sulphide, a value of 0.02mg/L was used; however, a result of < the laboratory's method detection limit is indicative of the possible absence of hydrogen sulphide.

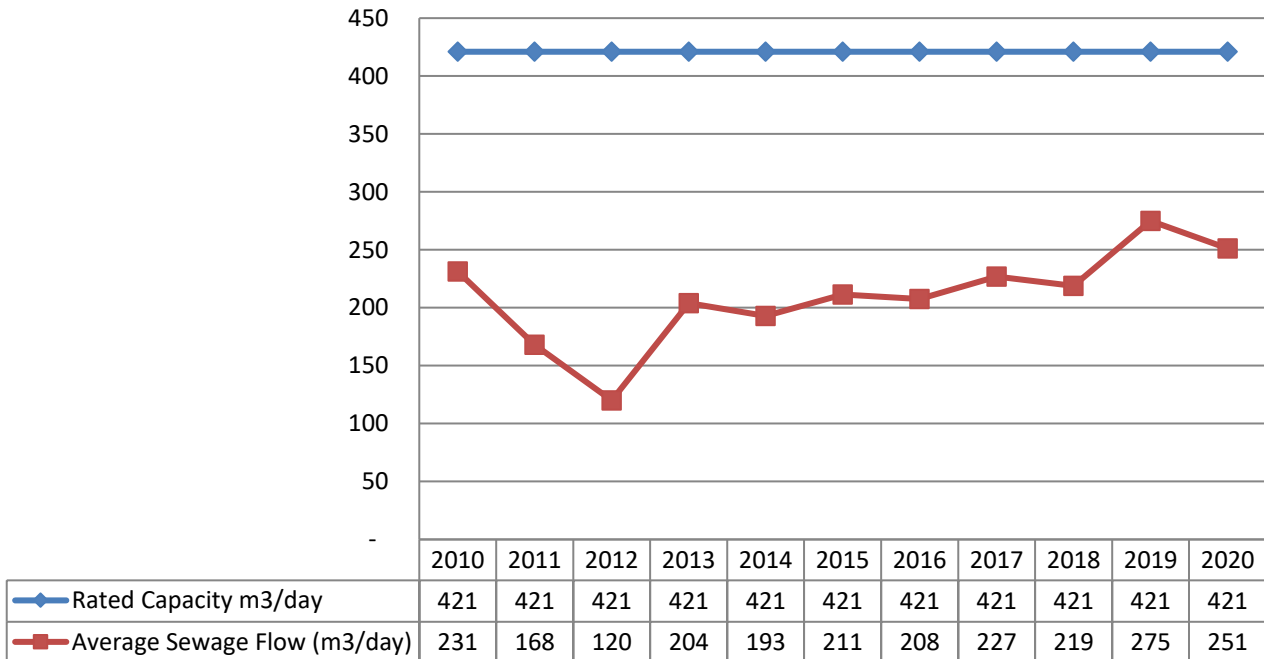
The remaining effluent results met the Effluent Objectives for the parameters listed.

Rated Capacity of 421m<sup>3</sup>/day is the Annual Average Daily Flow for which the Coboconk Sewage Lagoons is approved to handle sewage. The Average Daily Flow is determined by the cumulative total sewage flow into the plant during a calendar year, which is then divided by the number of days during which sewage flowed into the plant. The total raw flow for 2020 was 92,059m<sup>3</sup> resulting in an average daily flow of 251.26m<sup>3</sup>/day. This is a decrease from 2019 which had an average daily flow of 275.06m<sup>3</sup>/day.

The following graph shows the lagoon has been operating within the Rated Capacity for the past ten years.

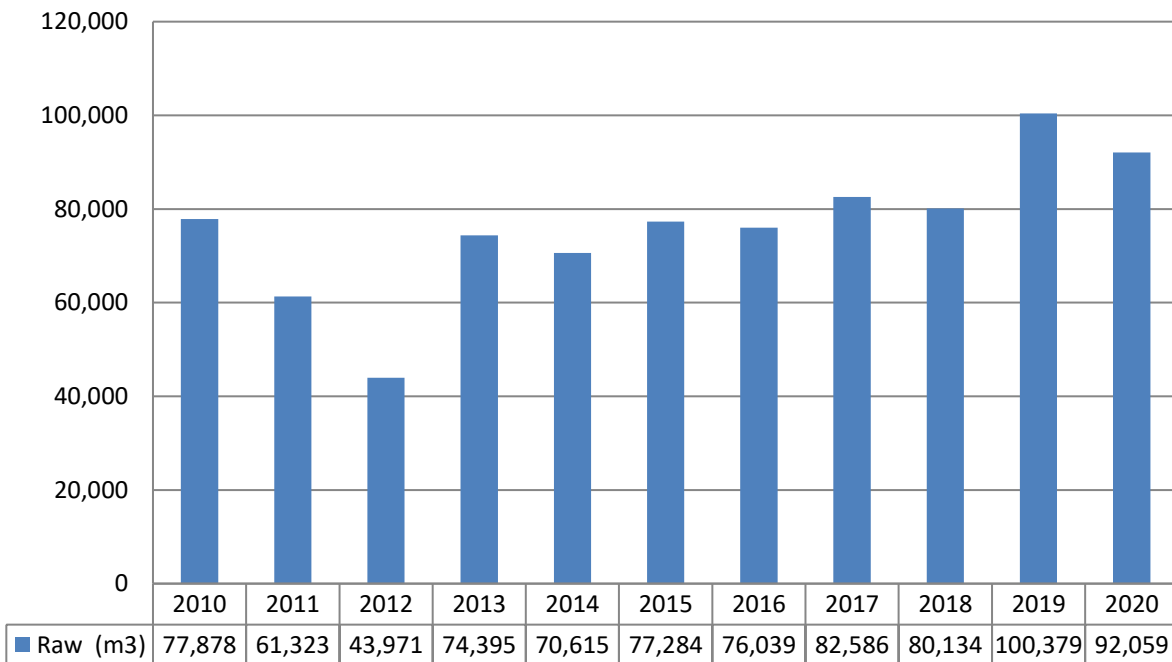
#### Average Sewage Flow & Rated Capacity Comparison





Additionally, the following graph depicts total annual sewage flow since 2010 into the Coboconk Sewage Lagoons.

Annual Total Sewage Flow Comparison



Effluent quality assurance is maintained in several ways. Laboratory samples are sent to accredited laboratory (SGS Lakefield) for analysis of all effluent parameters. Sampling calendars issued to the operator denote frequency of sampling and these calendars are submitted to the Process Compliance Technician at the end of each month. Raw, effluent and effluent plume monitoring samples are collected as per the ECA and the results are reviewed on a regular basis to ensure compliance with the site's objectives and limits.

Work orders are scheduled through our asset maintenance management system to ensure preventative and corrective maintenance is completed and recorded by operations staff. A summary is attached as Appendix III. Flow meters are calibrated annually and the 2020 calibration report is provided in Appendix IV.

OCWA conducts internal audits of facilities and develops Action Plans to ensure deficiencies are identified and corrected. OCWA has developed comprehensive manuals detailing operations, maintenance, instrumentation and emergency procedures. To ensure facilities are operated in compliance with applicable legal requirements, facility staff has access to a network of compliance and support professionals at the hub, region and corporate level.

Continuous phosphorus removal is achieved with the dosing of aluminum sulphate. A summary of its use and dosing rates for 2020 is provided in Table 7.

**Table 7: Coagulant Use and Dosing 2020**

<b>Month</b>	<b>Aluminum Sulphate (kg)</b>	<b>Aluminum Sulphate Average Dosage (mg/L)</b>
<b>January</b>	1,426.4	139.1
<b>February</b>	794.9	131.1
<b>March</b>	1,590.2	122.7
<b>April</b>	1,358.3	122.0
<b>May</b>	1,000.9	120.8
<b>June</b>	660.5	125.4
<b>July</b>	572.8	129.8
<b>August</b>	793.2	156.6
<b>September</b>	785.4	124.0
<b>October</b>	846.6	122.6
<b>November</b>	820.6	124.8
<b>December</b>	812.2	121.5

Some of the continuous efforts made to meet the Effluent Objectives are as follows:

### Efforts Made to Meet the Effluent Objectives of Condition 6

1. Sampling effluent and raw as per the ECA.
2. Routine inspection of the lagoons for berm stability, odours, and condition of cell contents.
3. Ensuring that aluminum sulphate is being dosed.
4. Calibration of the pH meter before use.
5. Performing preventative maintenance activities in accordance with work order schedules.
6. Monitoring treatment processes through review of lab results.
7. Annual calibration of flow meters.
8. Monitoring sludge depth.

(h) A Site Inspection Report was developed by the City and put into use in 2018. Inspections are completed by operations staff and forwarded to the City. These reports are reviewed during the routine meetings held between the City and OCWA. A summary of complaints received by the City of Kawartha Lakes and/or the operating authority is provided in the following table.

**Table 9: Summary of Community Complaints**

Date	Issue	Actions Taken
July 2, 2020	Odour	City representative completed site inspection.
July 20, 2020	Odour	City representative inspected site and met with resident. City representative set up email notifications with residents in area to notify them when operational activities undertaken at site such as transferring from south cell to north cell of lagoon.
August 8, 2020	Sewer back up	City representative met with resident and advised resident to contact a plumber.
August 11, 2020 – two complaints received.	Odour	CKL representative notified residents of transfer from south to north cell of lagoon.
August 12, 2020	Odour	CKL representative spoke with resident, email had been sent out that transfer was occurring but resident's internet was not working.
November 19, 2020	Sewer back up	Resident advised to contact plumber.

- (i)** No Notices of Modifications were submitted to the Water Supervisor in 2020.
- (j)** A summary of all modifications completed as a result of Schedule B, Section 3 are included in Appendix III: Maintenance Summary.
- (k)** The Water Supervisor has not requested any additional information be included in this report.