

Coboconk Sewage Lagoons

Works # 120002353

Annual Wastewater Performance Report

Prepared For: The City of Kawartha Lakes

Reporting Period of January 1st – December 31st, 2021

Issued: March 23, 2022

Operating Authorities:



OCWA



2021 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 2021, 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 – 2021 Discharges

Effluent Parameter (Column 1)	Concentration (mg/L unless otherwise indicated) (Column 2)	Concentration (mg/L)	Compliant (Y/N)	Waste Loading (kg/d unless otherwise indicated) (Column 3)	Waste Loading (kg/d)	Compliant (Y/N)
Spring Apr 15 - 20						
CBOD5	25.0 (average per discharge)	<3.0	Y	231.0	<20.5	Y
Total Suspended Solids	25.0 (average per discharge)	4.3	Y	231.0	29.6	Y
Total Phosphorus	0.5 (average per discharge)	<0.03	Y	4.62	<0.23	Y
Total Ammonia Nitrogen Spring (Apr 1 to May 31)	15.0 (daily limit)	6.6 6.1 5.6	Y Y Y	139.0	35.7 52.6 17.9	Y Y Y
Hydrogen Sulphide	0.1 (daily limit)	<0.02 <0.02 <0.02	Y Y Y	0.92	0.11 0.17 0.06	Y Y Y
pH	6.0 to 9.5 at all times	7.9 8.1 8.0	Y Y Y	-	-	-
Fall Dec 1 - 6						
CBOD5	25.0 (average per discharge)	<2.0	Y	231.0	<14.2	Y
Total Suspended Solids	25.0 (average per discharge)	<2.0	Y	231.0	<14.2	Y
Total Phosphorus	0.5 (average per discharge)	<0.04	Y	4.62	<0.26	Y
Total Ammonia Nitrogen Fall (Nov 1 to Dec 31)	8.0 (daily limit)	3.6 3.5 3.5	Y Y Y	74.0	17.7 29.5 14.9	Y Y Y

Hydrogen Sulphide	0.1 (daily limit)	<0.02	Y	0.92	0.10	Y
		<0.02	Y		0.17	Y
		<0.02	Y		0.08	Y
pH	6.0 to 9.5 at all times	6.3	Y	-	-	-
		7.0	Y			
		7.0	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 2021. 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 2021 effluent results for each discharge.

Note:

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

(a) The Seasonal Average Concentration of CBOD₅, 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 CBOD₅, 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 9,245m³/day.

The results in Table 1 show that the effluent concentrations and the waste loadings of cBOD₅, 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 2021.

Table 2. Coboconk Sewage Lagoon – Effluent E. coli Results for 2021 (org/100mL)

Seasonal Discharge Month	April	December
Monthly Geometric Mean Density of E. Coli	6.66	1.26
Compliant with Limit of 200 org/100 mL (Y/N)	Y	Y

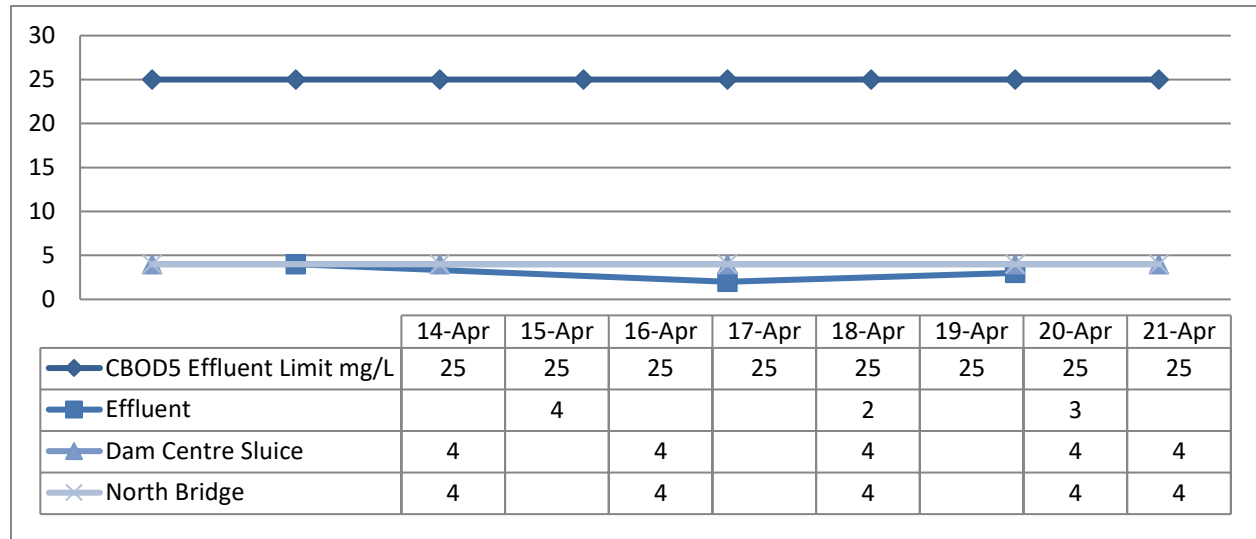
Total Kjeldhal Nitrogen (TKN) was also sampled in the effluent and results ranged from 6.3 – 7.8mg/L during the spring discharge periods and 3.6 – 4.2mg/L during the fall discharge period.

(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.

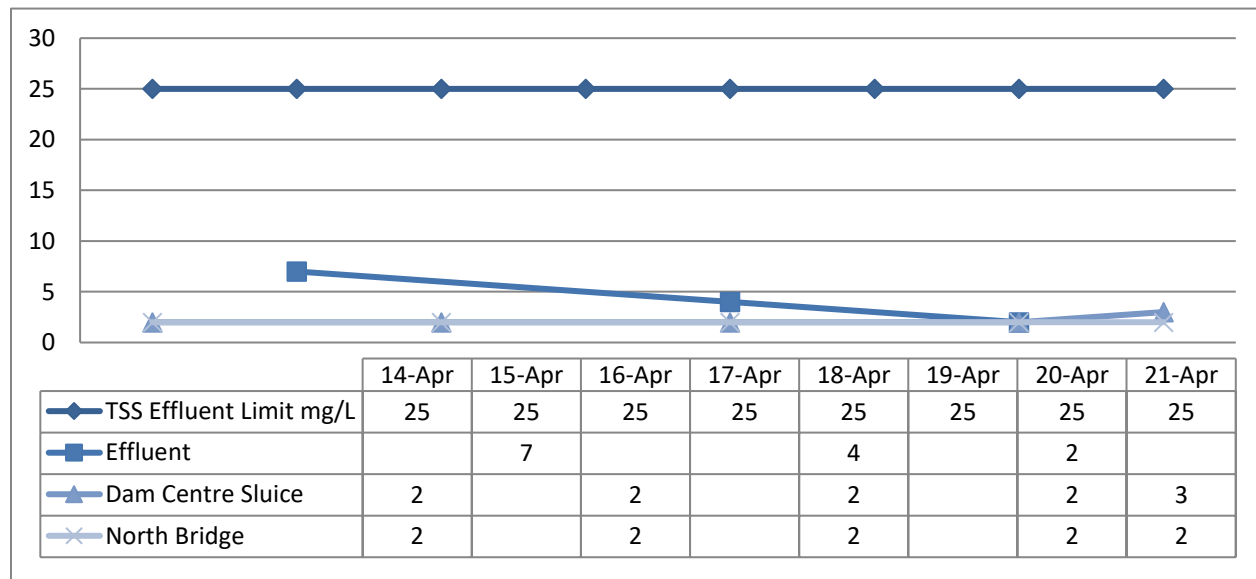
Spring discharge occurred April 15 to 20, 2021. Fall discharge occurred December 1 to 6, 2021. Results for the effluent, North Bridge and Centre Sluice Dam are presented in the following graphs and tables for each Effluent Plume Monitoring parameter.

Spring Discharge – April 15 to 20, 2021

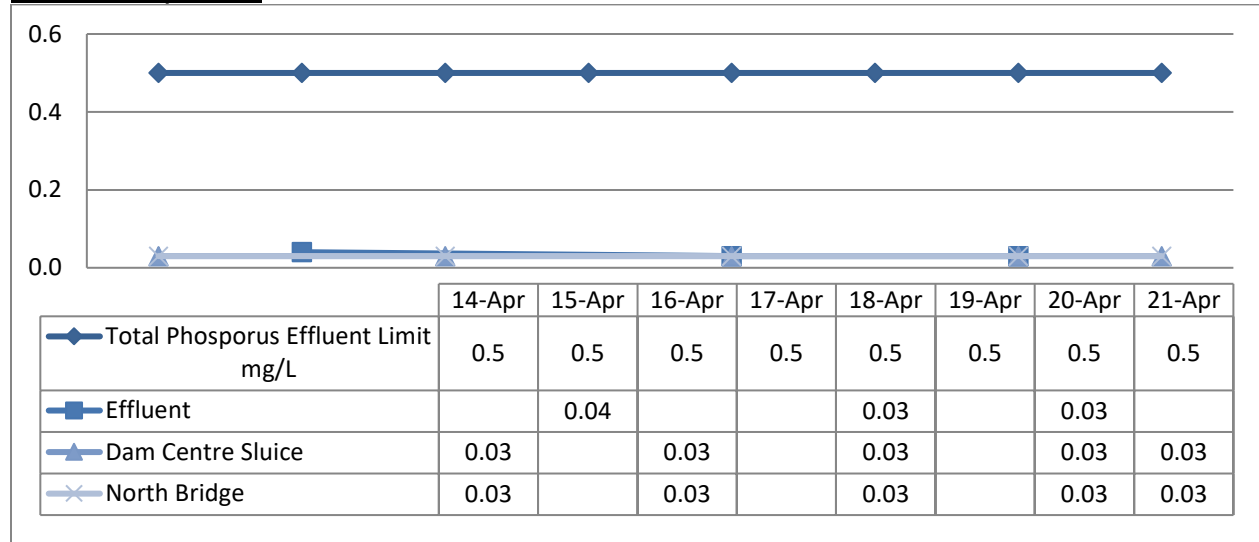
CBOD5



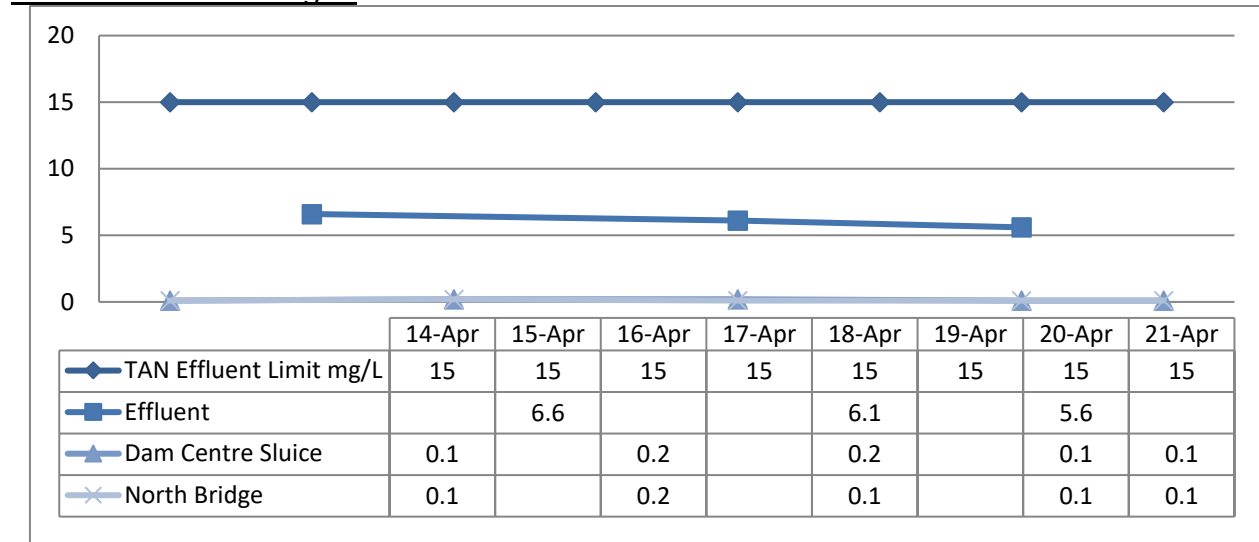
Total Suspended Solids



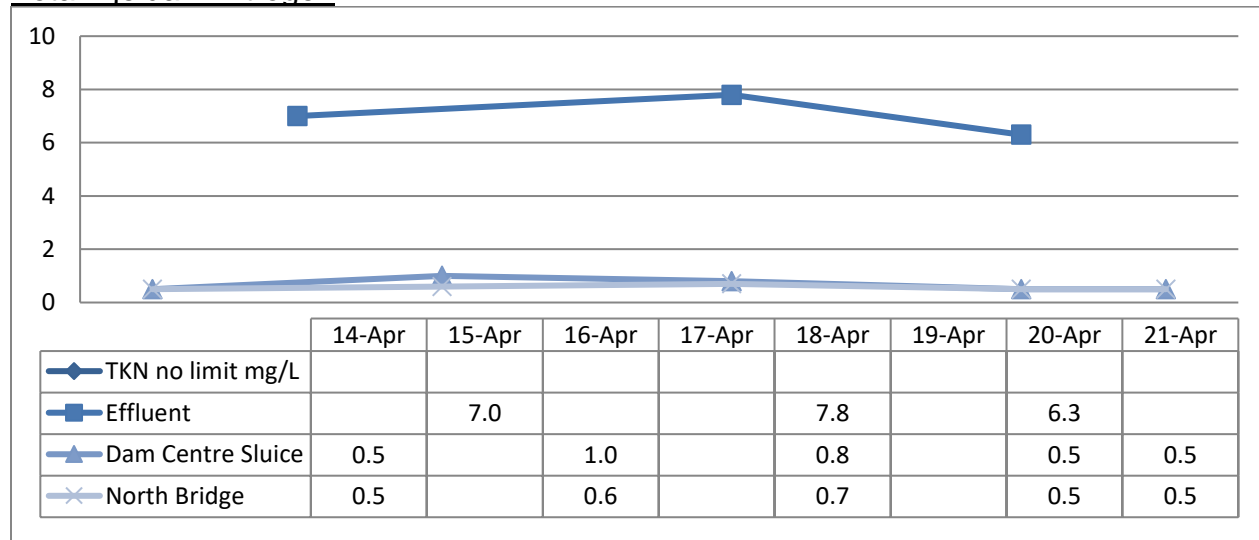
Total Phosphorus



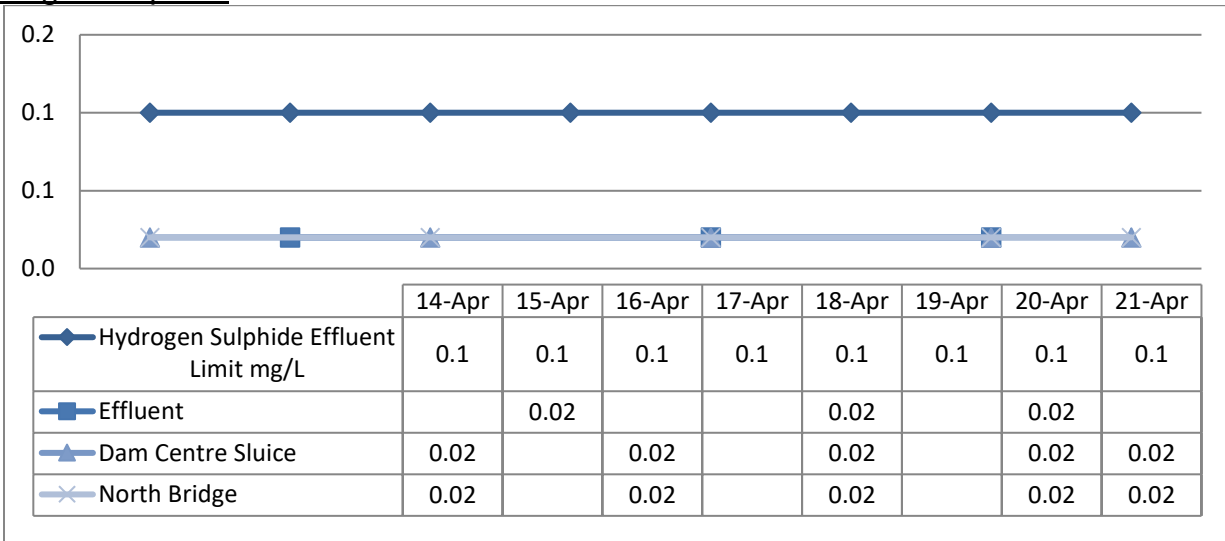
Total Ammonia Nitrogen



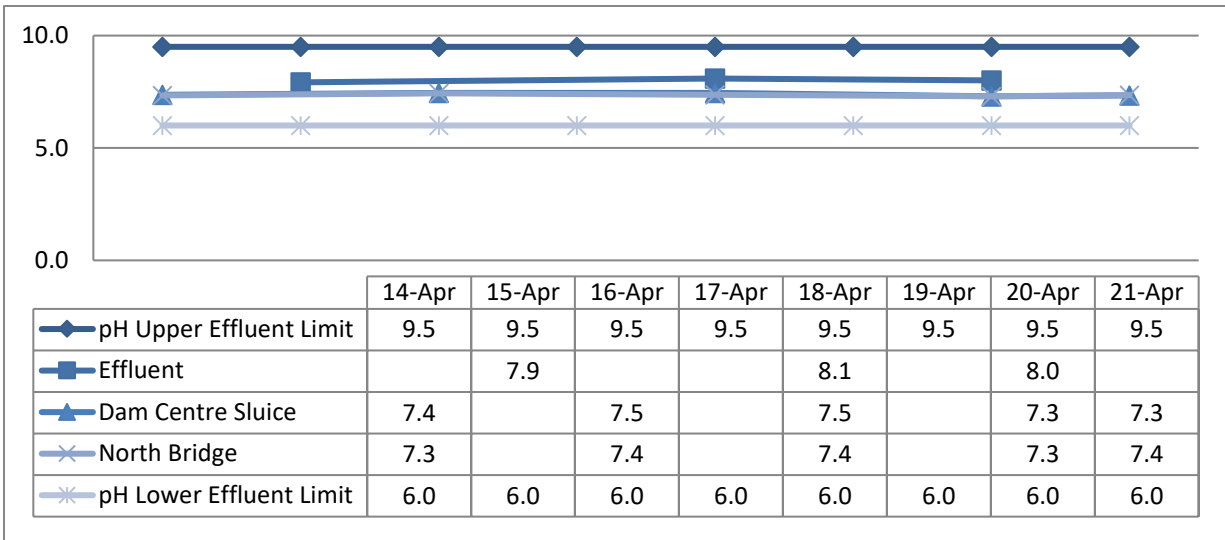
Total Kjeldahl Nitrogen



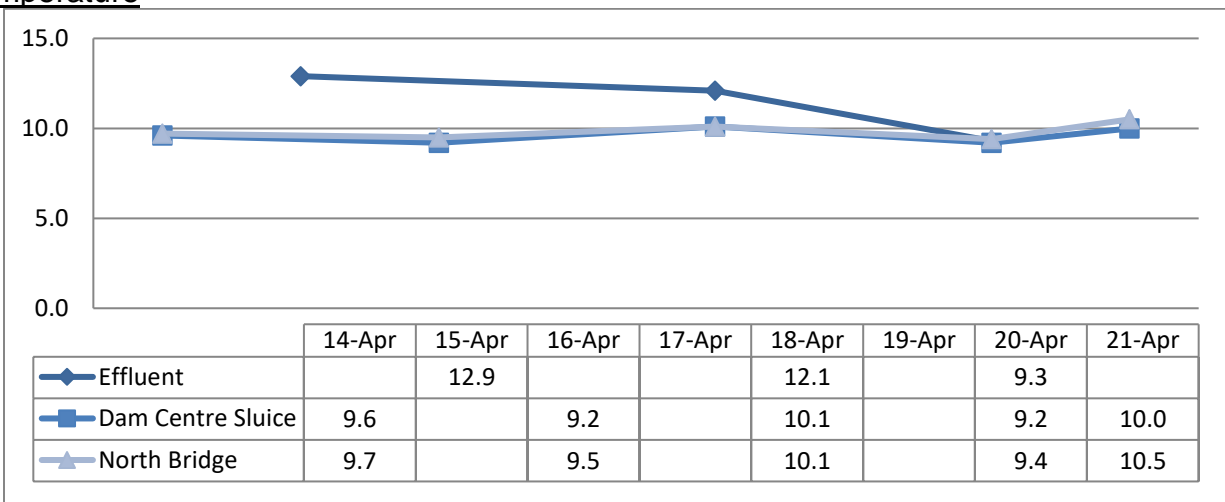
Hydrogen Sulphide



pH

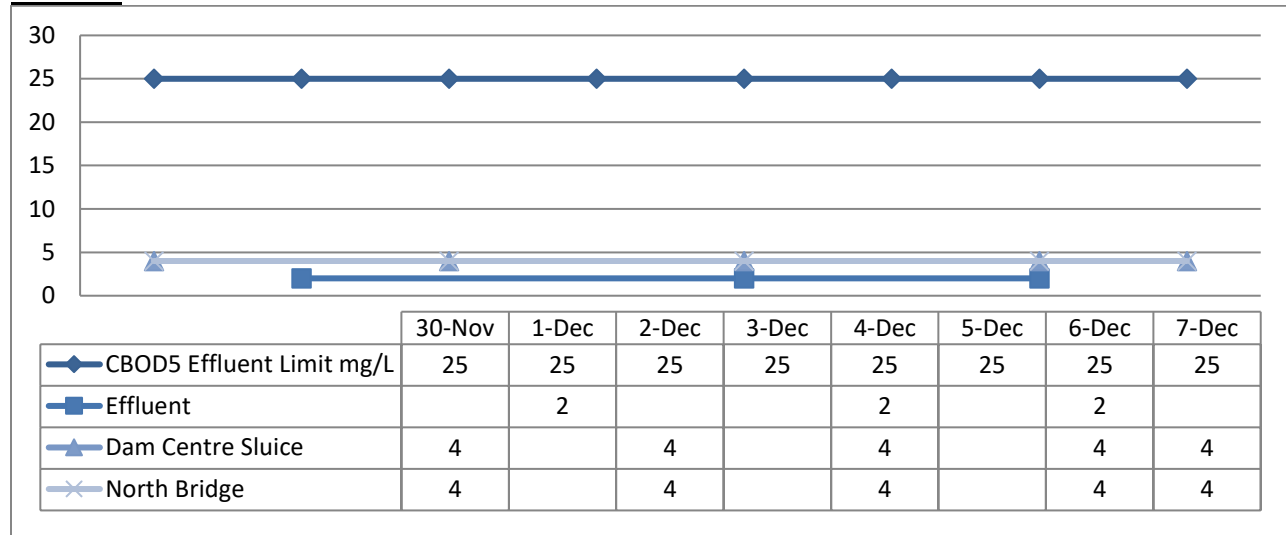


Temperature

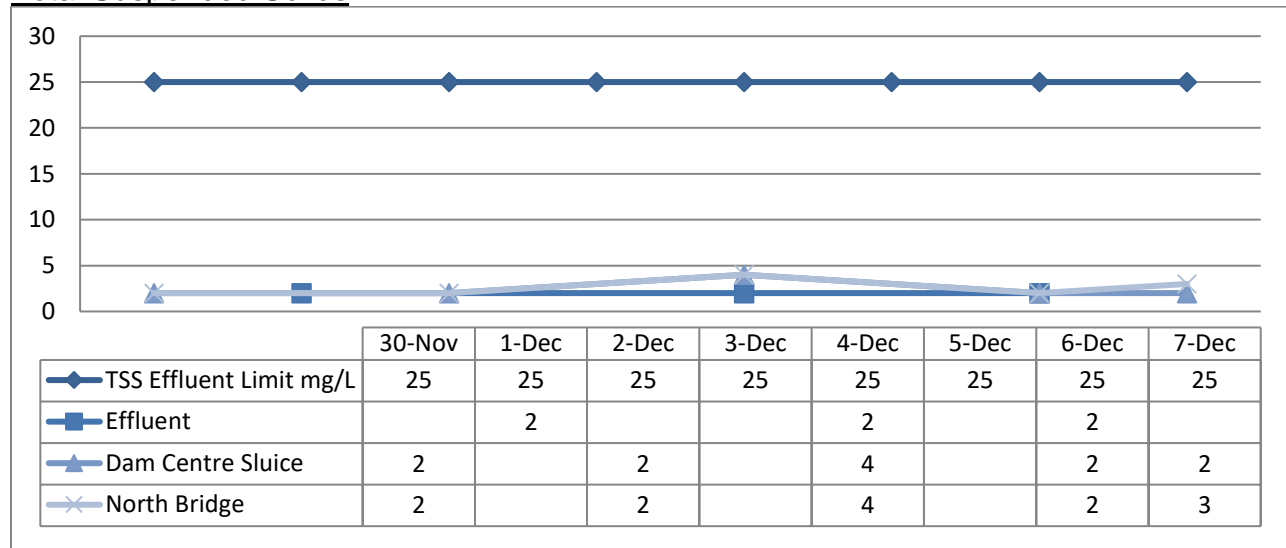


Fall Discharge – December 1 - 6, 2021

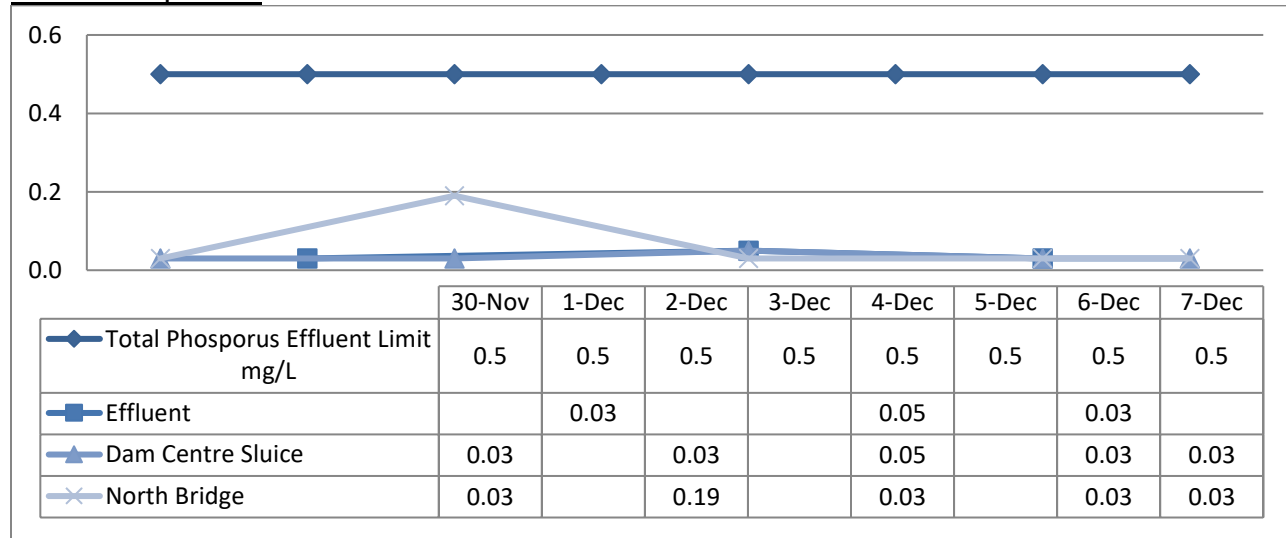
CBOD5



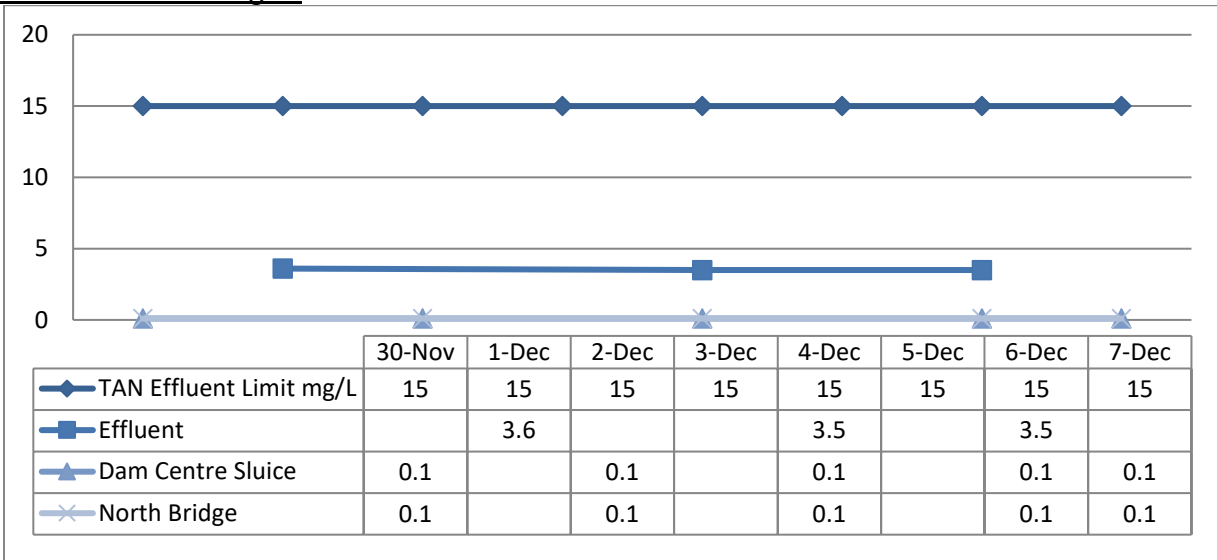
Total Suspended Solids



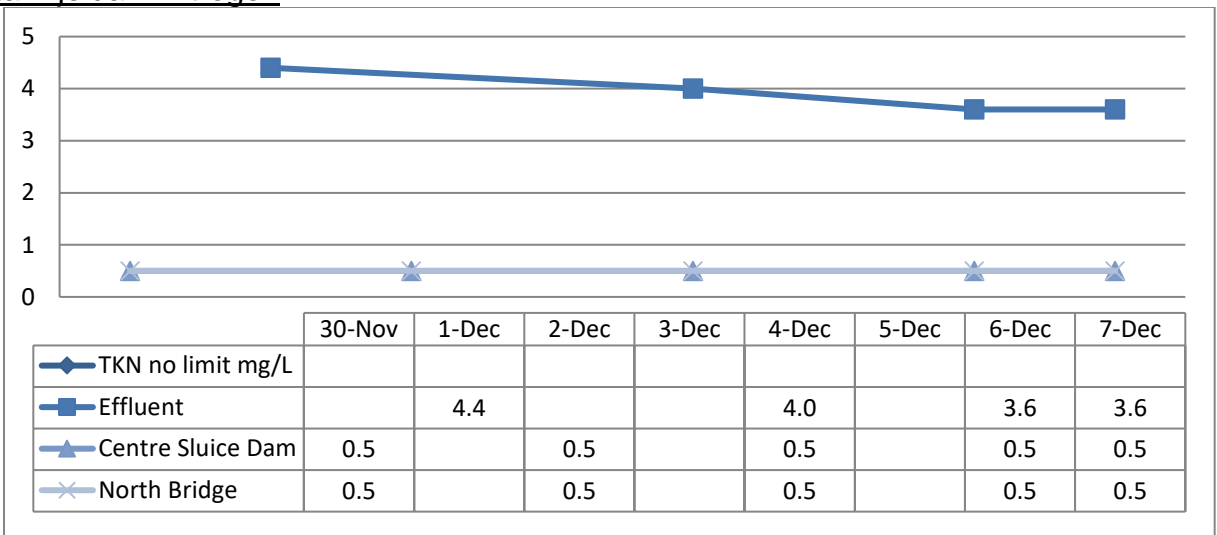
Total Phosphorus



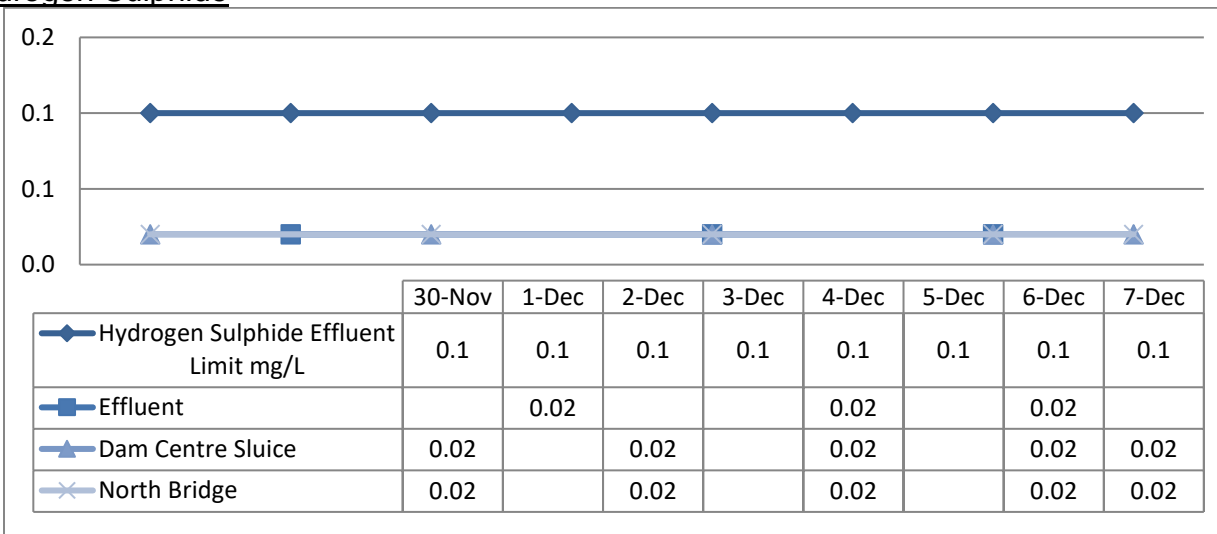
Total Ammonia Nitrogen



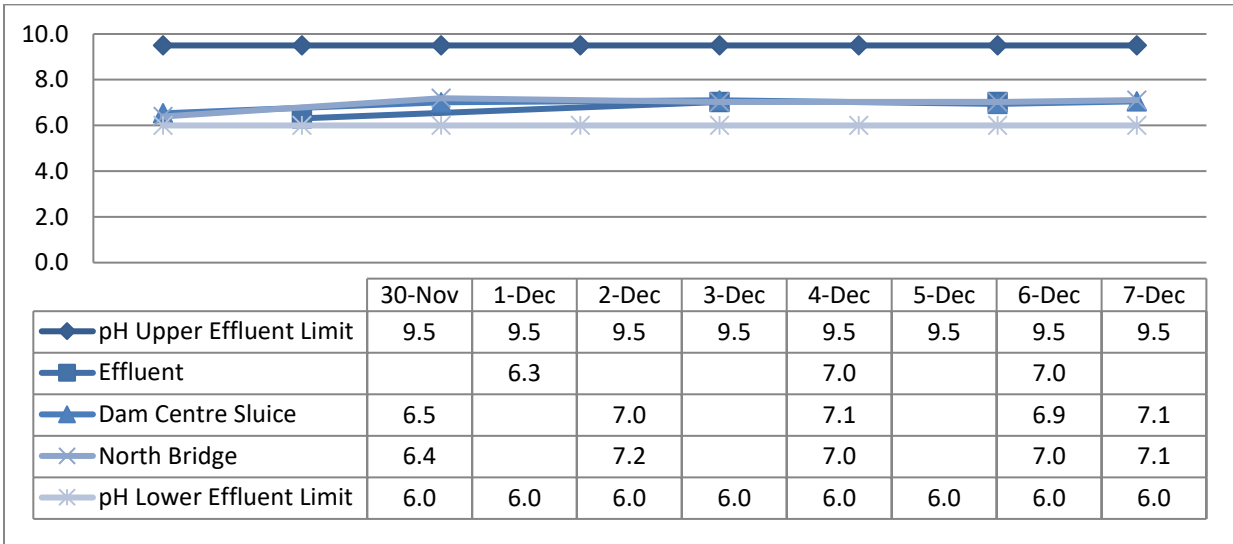
Total Kjeldahl Nitrogen



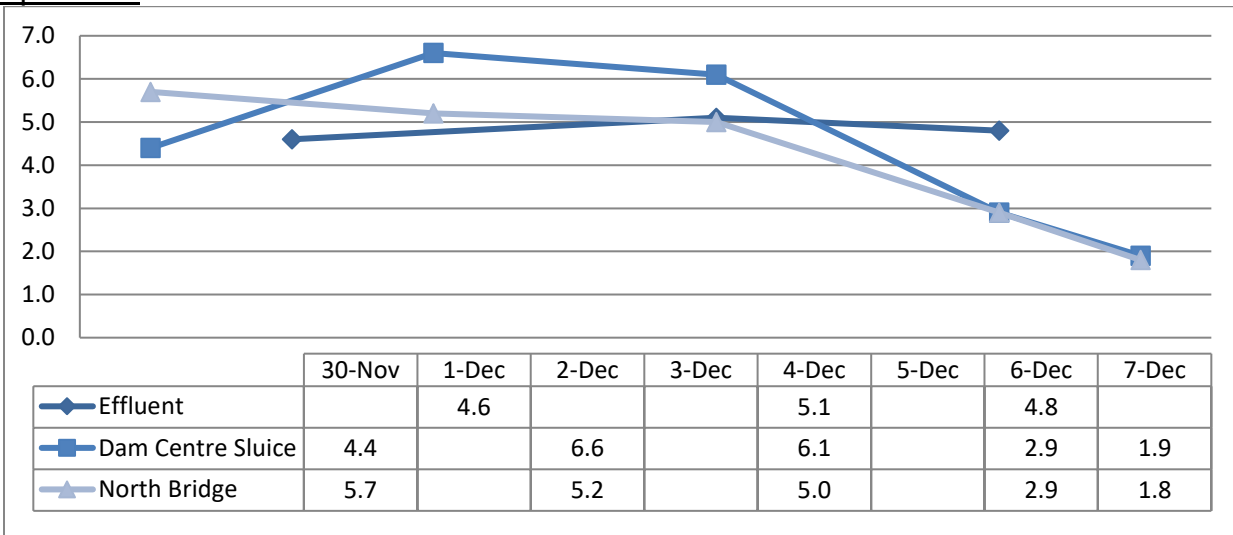
Hydrogen Sulphide



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 2021.

(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 2021.

Table 3. Coboconk Lagoon Effluent Un-ionized Ammonia Results for 2021

Date	Total Ammonia Nitrogen (mg/L)	Field Temperature (°C)	Field pH	Unionized Ammonia (mg/L)
Apr 15	6.6	12.9	7.9	0.120
Apr 18	6.1	12.1	8.1	0.164
Apr 20	5.6	9.3	8.0	0.097
Dec 1	3.6	4.6	6.3	0.001
Dec 4	3.5	5.1	7.0	0.005
Dec 6	3.5	4.8	7.0	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 9,245m³/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 ³ /day	Flow (m ³ /day)	Compliant Y/N	# Days / Discharge Limit	# of Days of Discharge	Compliant Y/N
Apr 15	9,245	5,402	Y	14	6	Y
Apr 16	9,245	8,641	Y	14	6	Y
Apr 17	9,245	8,652	Y	14	6	Y
Apr 18	9,245	8,620	Y	14	6	Y
Apr 19	9,245	6,514	Y	14	6	Y
Apr 20	9,245	3,197	Y	14	6	Y

Total volume of effluent discharged in the Spring of 2021 was 41,026m³.

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

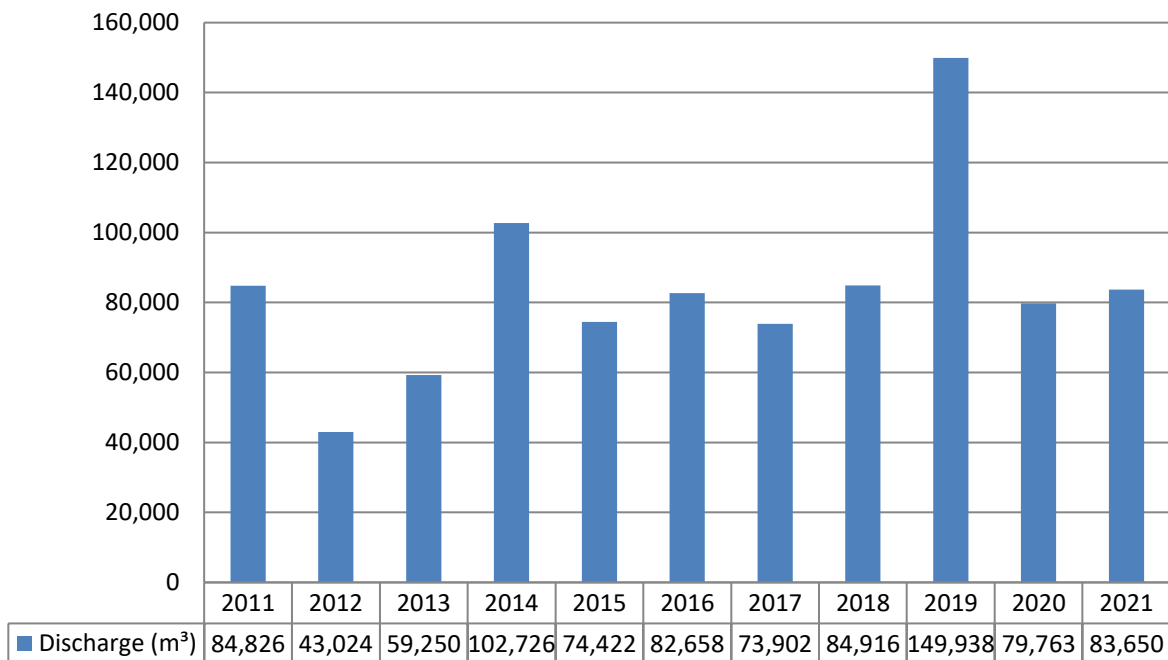
Date	Flow Limit m ³ /day	Flow (m/day)	Compliant Y/N	# Days / Discharge Limit	# of Days of Discharge	Compliant
Dec 1	9,245	4,914.2	Y	14	6	Y
Dec 2	9,245	8,727.9	Y	14	6	Y
Dec 3	9,245	8,552.4	Y	14	6	Y
Dec 4	9,245	8,422.5	Y	14	6	Y
Dec 5	9,245	7,760.5	Y	14	6	Y
Dec 6	9,245	4,246.5	Y	14	6	Y

Total volume of effluent discharged in the Fall of 2021 was 42,624m³.

The total volume of effluent discharged from the Coboconk Sewage Lagoons is 83,650m³.

The following chart provides the annual total discharge flow from the Coboconk Sewage Lagoons since 2011.

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 2021.

(f) A sludge disposal program took place at the Coboconk Sewage Lagoons from October – November 29, 2012 with 5,888.8m³ of sludge being removed from the south cell and disposed of via field application. No sludge was removed in 2021. Sludge removal is planned to occur in 2022.

(g) No operating problems occurred in 2021.

Appendix III (attached) outlines scheduled and corrective maintenance completed throughout 2021.

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

Table 6: Coboconk Sewage Lagoon – Effluent Objectives – 2021 Discharges

Effluent Parameter	Concentration Objective (mg/L unless otherwise indicated)	Concentration (mg/L)	Objective Met (Y/N)	Waste Loading (kg/d unless otherwise indicated)	Waste Loading (kg/d)	Objective Met (Y/N)
Spring Apr 15 - 20						
CBOD5	15.0 (average per discharge)	<3.0	Y	139.0	<20.5	Y
Total Suspended Solids	20.0 (average per discharge)	4.3	Y	185.0	29.6	Y
Total Phosphorus	<0.5 (average per discharge)	<0.03	Y	<4.62	<0.23	Y
Total Ammonia Nitrogen Spring (Apr 1 to May 31)	10.0 (daily limit)	6.6 6.1 5.6	Y Y Y	92.5	35.7 52.6 17.9	Y Y Y
Hydrogen Sulphide	Absent	<0.02 <0.02 <0.02	Y Y Y	Absent	0.11 0.17 0.06	See note below
pH	6.5 to 8.5 at all times	7.9 8.1 8.0	Y Y Y	-	-	-
E. Coli	200 organisms/100mL	74 2 2	Y Y Y	-	-	-
Fall Dec 1 - 6						
CBOD5	15.0	<2.0	Y	139.0	<15.3	Y

Effluent Parameter	Concentration Objective (mg/L unless otherwise indicated)	Concentration (mg/L)	Objective Met (Y/N)	Waste Loading (kg/d unless otherwise indicated)	Waste Loading (kg/d)	Objective Met (Y/N)
	(average per discharge)					
Total Suspended Solids	20.0 (average per discharge)	<2.0	Y	185.0	30.7	Y
Total Phosphorus	<0.5 (average per discharge)	<0.04	Y	<4.62	<0.33	Y
Total Ammonia Nitrogen Fall (Nov 1 to Dec 31)	5.0 (daily)	3.6 3.5 3.5	Y Y Y	46.2	16.7 24.8 16.2	Y Y Y
Hydrogen Sulphide	Absent	<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	6.3 7.0 7.0	N Y Y	-	-	-
E. Coli	200 organisms/100mL	0 0 <2	Y Y Y	-	-	-

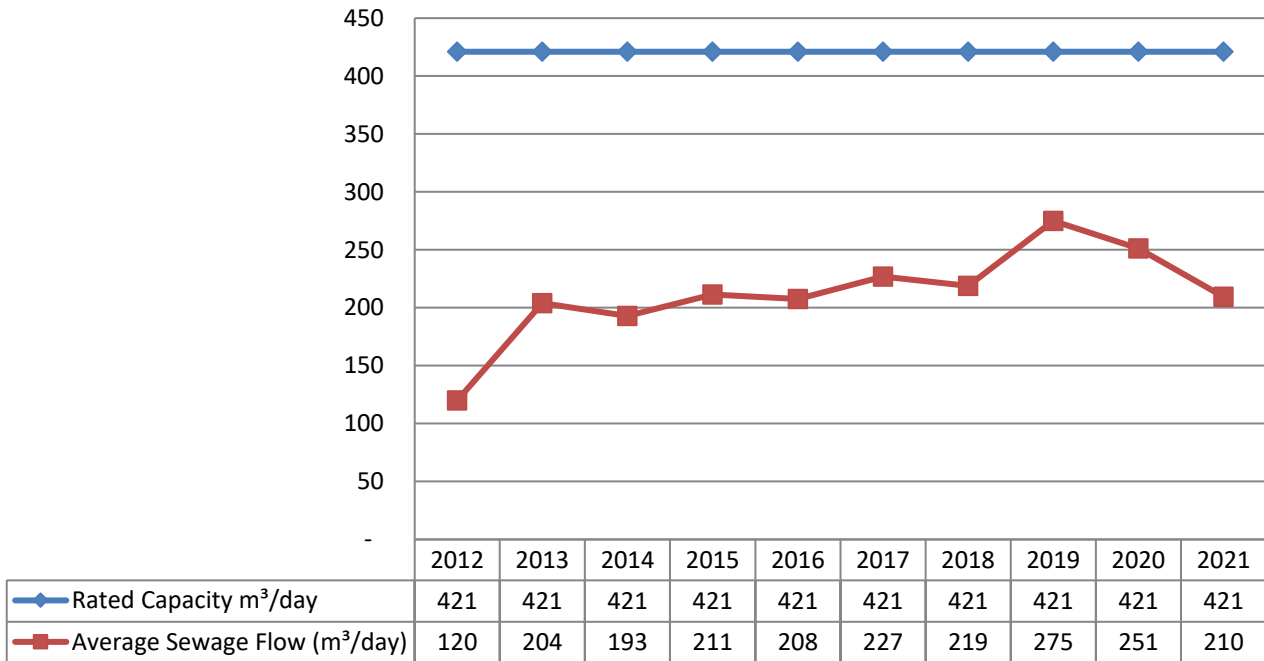
Note: For the purpose of calculating loadings for hydrogen sulphide, a value of 0.02mg/L was used; however, a result of < the laboratory's method detection limit is indicative of the possible absence of hydrogen sulphide.

One field pH measurement taken during the Fall discharge period on December 1, 2021 was below the lower objective for pH. The remaining effluent results met the Effluent Objectives for the parameters listed.

Rated Capacity of 421m³/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 2021 was 76,497.6m³ resulting in an average daily flow of 209.58m³/day. This is a decrease from 2020 which had an average daily flow of 251.26m³/day.

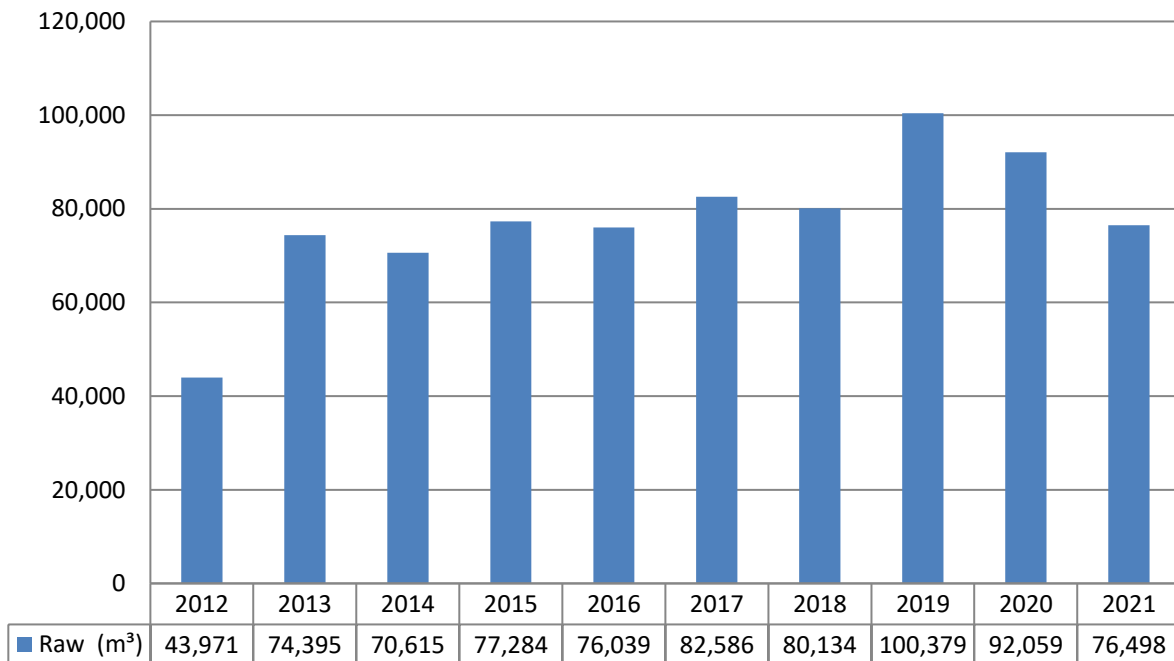
The following graph shows the lagoon has been operating within the Rated Capacity for the past ten years.

Average Sewage Flow & Rated Capacity Comparison



Additionally, the following graph depicts total annual sewage flow since 2012 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 2021 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 2021 is provided in Table 7.

Table 7: Coagulant Use and Dosing 2021

Month	Aluminum Sulphate (kg)	Aluminum Sulphate Average Dosage (mg/L)
January	572.3	18.5
February	520.0	18.6
March	863.7	27.9
April	845.3	28.2
May	910.8	29.4
June	547.0	18.2
July	974.5	31.4
August	1,145.8	36.9
September	532.0	17.7
October	693.9	22.4
November	872.2	29.1
December	881.6	28.4

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
February 11, 2021	Odour	City representative followed up with resident. City provides email notifications to residents in area to notify them when maintenance activities are undertaken at site.
February 25, 2021 – two complaints received	Odour	City representative inspected site and spoke with residents.
June 8, 2021	Odour	City representative spoke with resident and operator inspected site.
June 14, 2021	Sewer – clean out pipe damaged.	CKL repaired.
December 6, 2021	Sewer – maintenance-hole cover hit by snowplow.	CKL lower maintenance-hole frame.

(i) No Notices of Modifications were submitted to the Water Supervisor in 2021.

(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.