

2022

# Wastewater Performance Report

Township of Stirling-Rawdon



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*Reporting Period: January 1<sup>st</sup>- December 31<sup>st</sup>, 2022*  
*Revision: 0*

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On January 23, 2023 the issuance of the environmental compliance approval number A-500-6126377731 Version 2.0 revoked environmental compliance approval number A-500-6126377731 Version 1.1 issued December 3, 2021

Under the ECA # A-500-6126377731, Section 11 (4) requires the Performance Report to contain the following:

- a. A summary and interpretation of all Influent, Imported Sewage and Processed Organic Waste monitoring data, and a review of the historical trend of the sewage characteristics and flow rates;
- b. a summary and interpretation of all Final Effluent monitoring data, including concentration, flow rates, loading and a comparison to the design objectives and compliance limits in this Approval, including an overview of the success and adequacy of the Works;
- c. a summary of all operating issues encountered and corrective actions taken;
- d. a summary of all normal and emergency repairs and maintenance activities carried out on any major structure, equipment, apparatus or mechanism forming part of the Works;
- e. a summary of any effluent quality assurance or control measures undertaken;
- f. a summary of the calibration and maintenance carried out on all Influent, Imported Sewage and Final Effluent monitoring equipment to ensure that the accuracy is within the tolerance of that equipment as required in this Approval or recommended by the manufacturer;
- g. a summary of efforts made to achieve the design objectives in this Approval, including an assessment of the issues and recommendations for pro-active actions if any are required under the following situations:
  - a. when any of the design objectives is not achieved more than 50% of the time in a year, or there is an increasing trend in deterioration of Final Effluent quality;
  - b. when the Annual Average Daily Influent reaches 80% of the Rated Capacity
- h. a tabulation of the measured volume of sludge accumulated in the lagoon cells in five year intervals and the estimated volume in the interim years and when sludge was disposed of during the reporting period, a summary of disposal locations and volumes of sludge disposed at each location;
- i. a summary of any complaints received and any steps taken to address the complaints;
- j. a summary of all Bypasses, Overflows, other situations outside Normal Operating Conditions and spills within the meaning of Part X of EPA and abnormal discharge events;

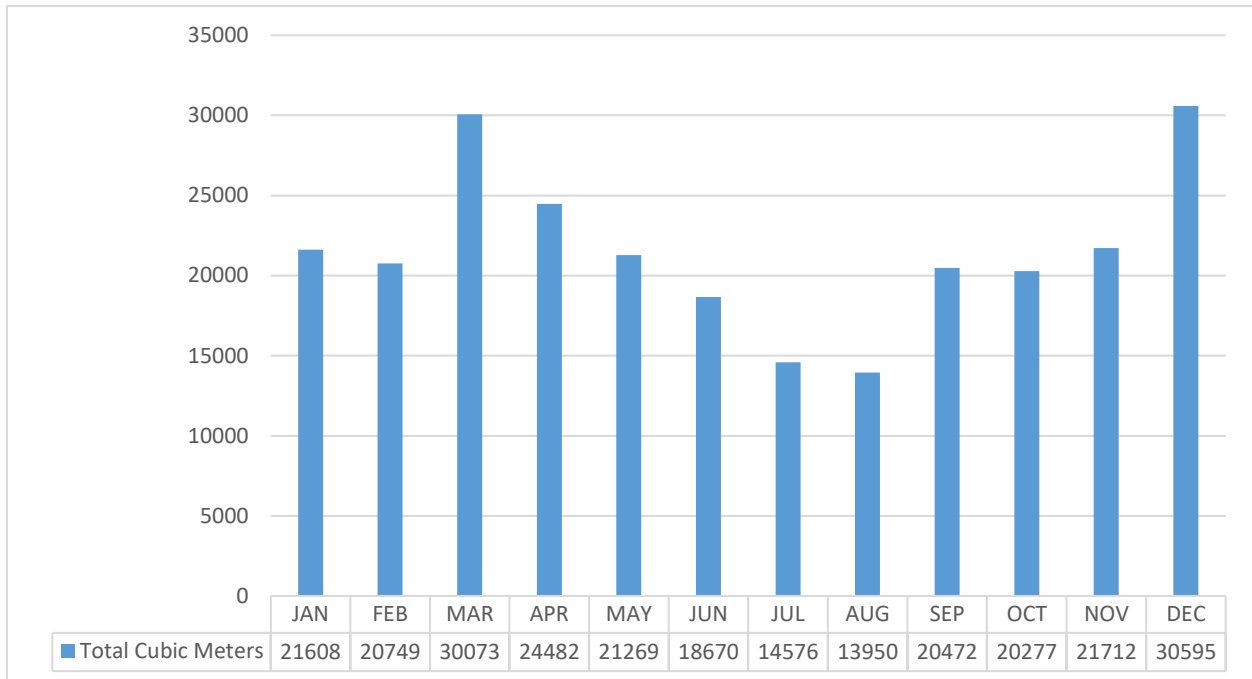
- k. a summary of all Notice of Modifications to Sewage Works completed under Paragraph 1.d of Condition 10, including a report on status of implementation of all modification;
- l. a summary of efforts made to achieve conformance with Procedure F-5-1 including but not limited to projects undertaken and completed in the sanitary sewer system that result in overall Bypass/Overflow elimination including expenditures and proposed projects to eliminate Bypass/Overflows with estimated budget forecast for the year following that for which the report is submitted;
- m. any changes or updates to the schedule for the completion of construction and commissioning operation of major process(es) equipment groups in the Proposed Works;
- n. a summary of any deviation from the monitoring schedule and reasons for the current reporting year and a schedule for the next reporting year.

The following report is composed of the records for the Stirling Lagoon and Constructed Wetlands for the year 2022. The facility is owned and operated by The Corporation of The Township of Stirling-Rawdon.

- a. Environmental Compliance Approval Number A-500-6126377731 Rev 2.0 a summary and interpretation of all Influent monitoring data, and a review of the historical trend of the sewage characteristics and flow rates.

The Environmental Compliance Approval requires that everything practicable be undertaken to operate the Sewage Treatment Plant so that the annual average daily influent is within the Rated Capacity. The Rated Capacity of the Stirling-Rawdon Lagoon is 1500 m<sup>3</sup>/day and the 2022 annual average daily influent flow was 708 m<sup>3</sup>/day or 47.2 % of the Rated Capacity. The total influent flow in 2022 was 258,433 m<sup>3</sup>.

**Graph 1: 2022 Influent Monthly Flow Totals**



**Graph 2: 2022 Influent Flows Daily Minimum, Maximum and Average Flows**

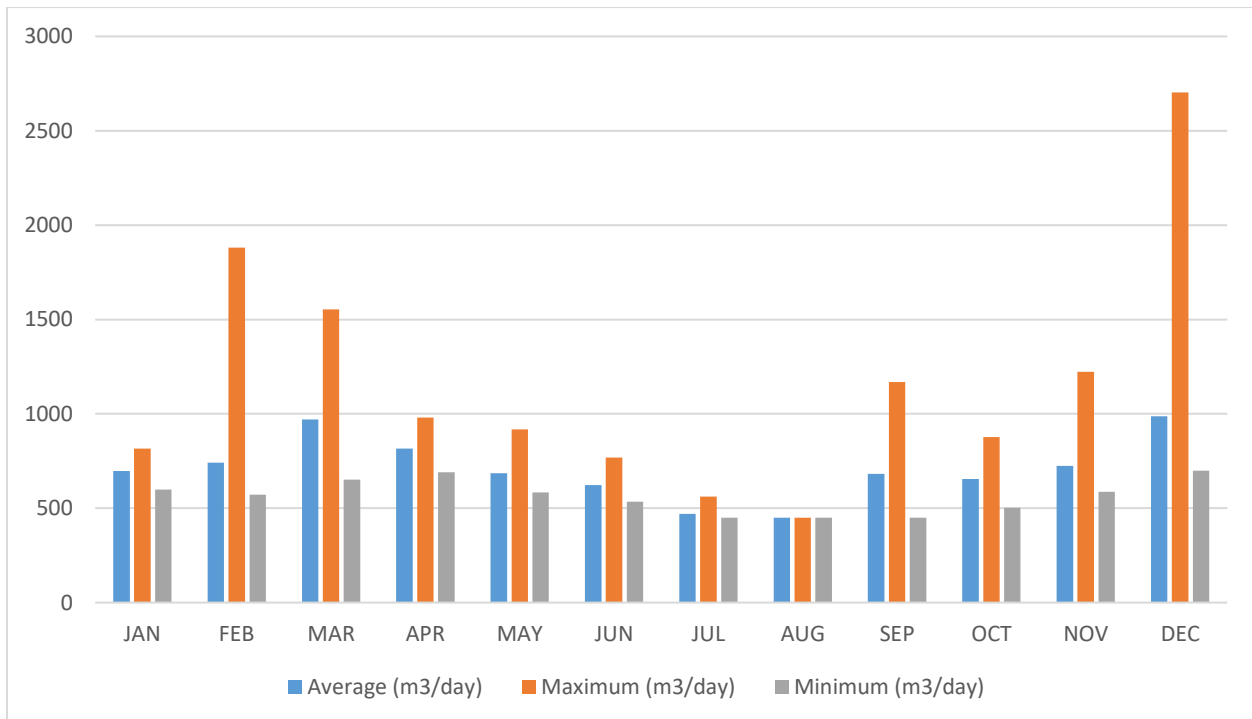


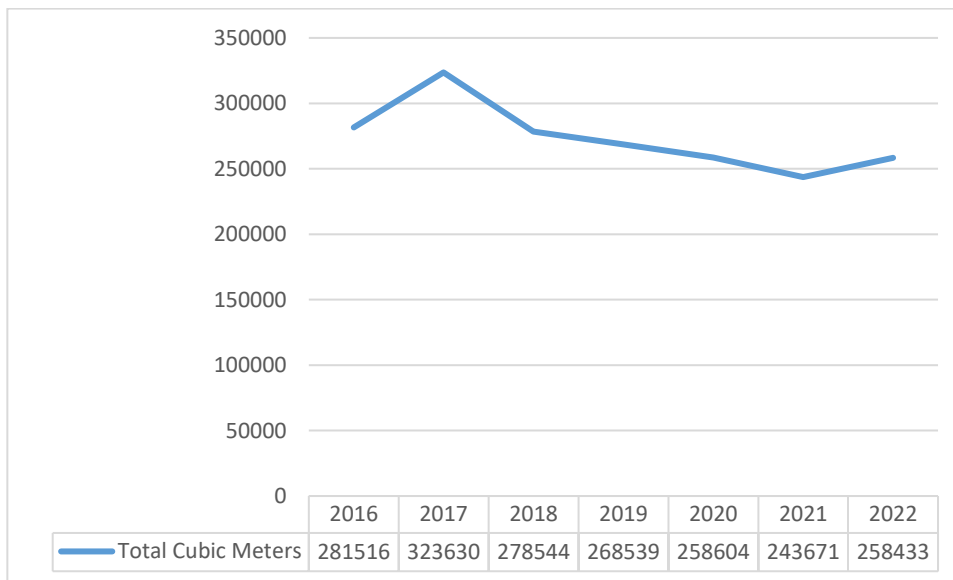
Table 1 reviews the historical trend of the influent sewage characteristics for the Stirling Lagoon, as required by Environmental Compliance Approval A-500-6126377731, Condition 11 (4) (a)

**Table 1: 2016- 2021 Historical Average Influent Sewage Characteristics for the Stirling Lagoon**

Year	BOD (mg/L)	TSS (mg/L)	TP (mg/L)	TKN (mg/L)
2016	371.7	299.8	7.36	49.4
2017	271.7	222.6	4.82	38.63
2018	354.5	327.3	5.08	40.53
2019	331.6	327	5.23	41.54
2020	359.7	398	4.1	36.78
2021	198.8	237.7	4.18	38.1
2022	165.6	222.8	3.68	34.3

Table 1 shows that influent sewage nutrients have decreased slightly since 2016.

**Graph 3: 2016 – 2022 Historical Influent Flows for the Stirling Sewage Lagoon**

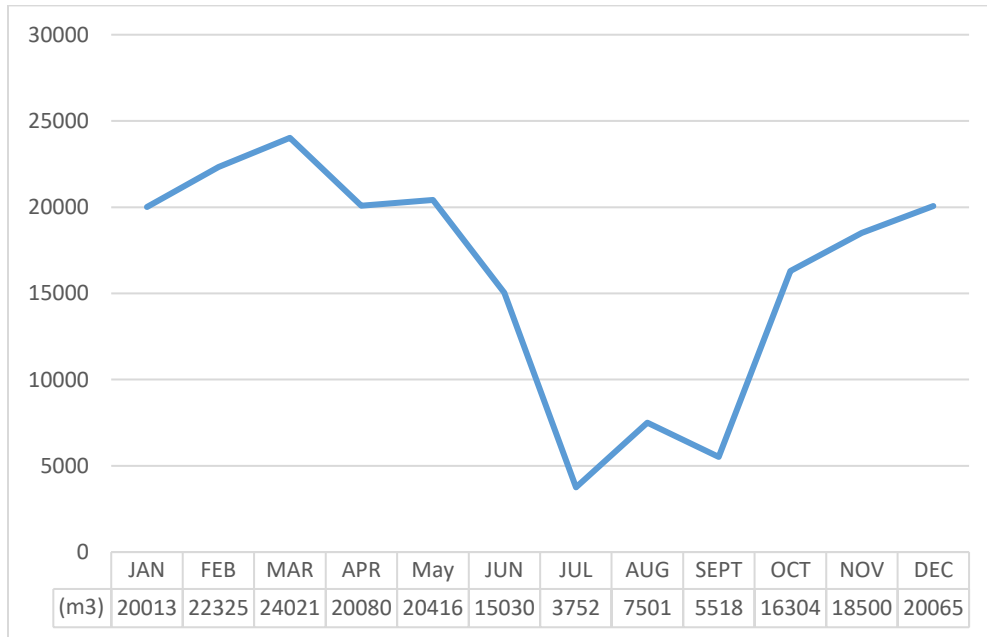


Graph 3 shows that the historical influent flows for the Stirling-Rawdon Lagoon since 2017 have been declining. The spike in 2017 can be attributed to the extremely wet spring season.

- a. Environmental Compliance Approval Number A-500-6126377731 requires a summary and interpretation of all Final Effluent monitoring data, including concentration, flow rate, loading and a comparison to the design objectives and compliance limits in this Approval, including an overview of the success and adequacy of the Works.

The following graphs provide final effluent flows for 2022 at the Stirling Sewage Lagoon. Final effluent is directed to the Mud Creek and ultimately discharged to Rawdon Creek. The Stirling lagoon can discharge final effluent year round without seasonal restrictions.

**Graph 4: 2022 Final Effluent Monthly Flow Totals**



**Graph 5: 2022 Effluent Daily Minimum, Maximum and Average Flows**

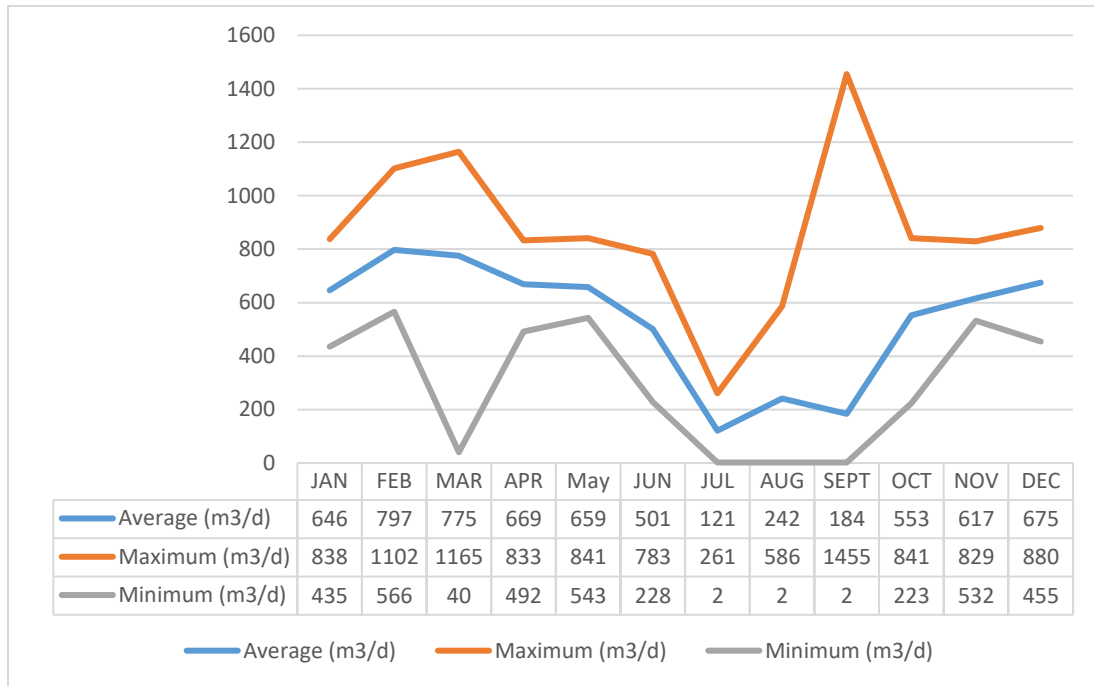


Table 2 outline effluent criteria limits as set out in Schedule C of the Environmental Compliance Approval Number A-500-6126377731.

**Table 2: Stirling Sewage Lagoon- Final Effluent Compliance Limits 2022**

Effluent Parameters	Average Effluent Concentration Limit (mg/L)	Actual Monthly Average Effluent Concentration (mg/l)	Compliant (Y/N)
<b>CBOD5</b>	10	2.6	Y
<b>Total Suspended Solids</b>	10	3.8	Y
<b>Total Phosphorus</b>	0.3	0.08	Y
<b>Unionized Ammonia</b>	0.1	0.009	Y
<b>Undissociated Hydrogen Sulphide</b>	0.02	0.006 (MDL 0.006)	Y
<b>E.Coli</b>	*200 organisms/100 ml Monthly Geometric Mean Density	19.57	Y
<b>pH</b>	ph to be maintained 6.0 to 9.5, inclusive, at all times	7.93	Y

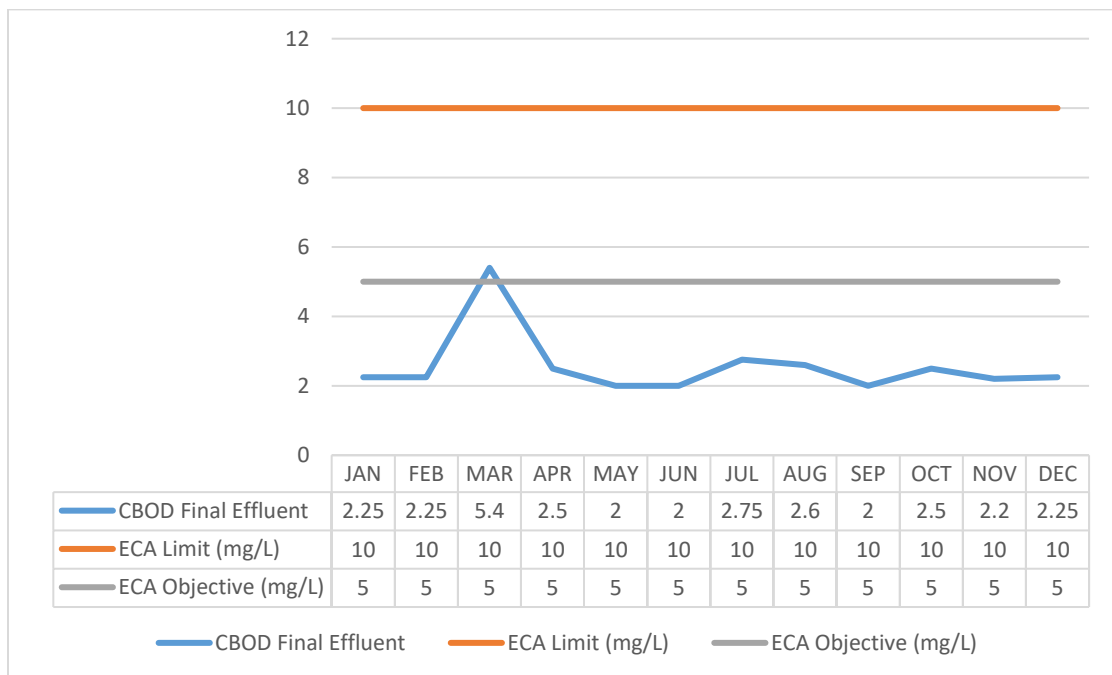
During the reporting period of 2022 the Stirling Sewage Lagoon met the compliance limits prescribed in the Environmental Compliance Approval Number A-500-6126377731.

The requirement to report to Environment Canada for the 2022 reporting period is due by February 14<sup>th</sup> each year. Effluent limits were in compliance in 2022 for the acute lethality testing of Rainbow Trout and Daphnia Magna.

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Sample Date	Daphnia Magna Mortality %	Rainbow Trout Mortality %	Dissolved Oxygen (mg/l)	pH	Conductivity (us/cm)	Hardness (mg/l as CaCO3)	Temp (°C)	H2O2 Dosage (mg/l)	N-NH3 (mg/l)
June 14, 2022	0	0	7.7	7.9	1104	190	20.0	0.15	0.003

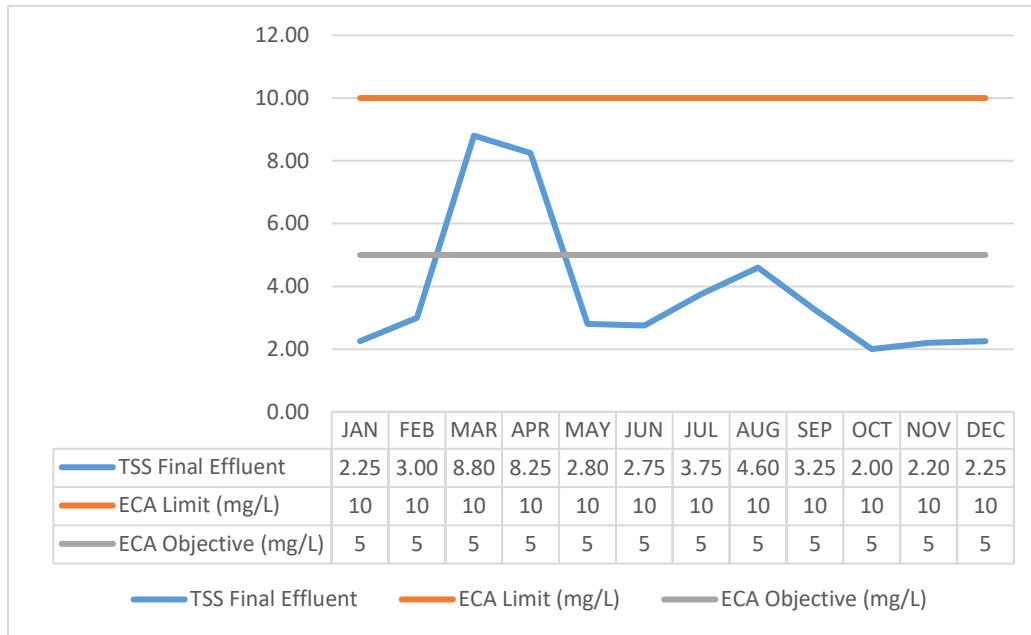
**Graph 6: 2022 Monthly CBOD5 Final Effluent Concentration Comparisons**



The Stirling Lagoon monthly average concentration for Carbonaceous Biochemical Oxygen Demand (CBOD5) was maintained below the ECA limit of 10.0 mg/L and below the ECA Objective of 5.0 mg/L except for the month of March where the objective was exceeded with an average of 5.4 mg/L.

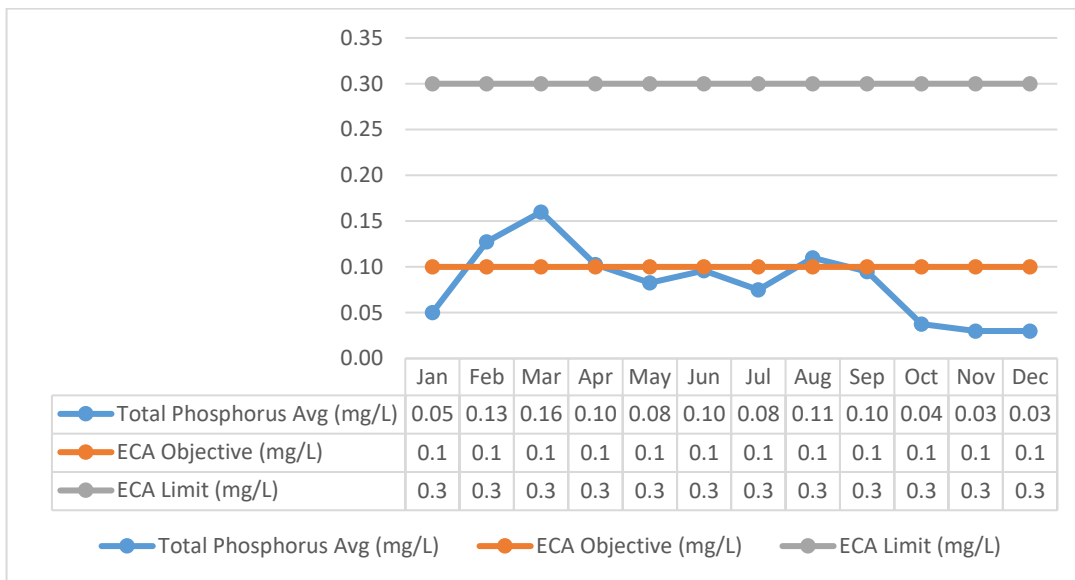


**Graph 7: 2022 Monthly TSS Final Effluent Concentration Comparisons**



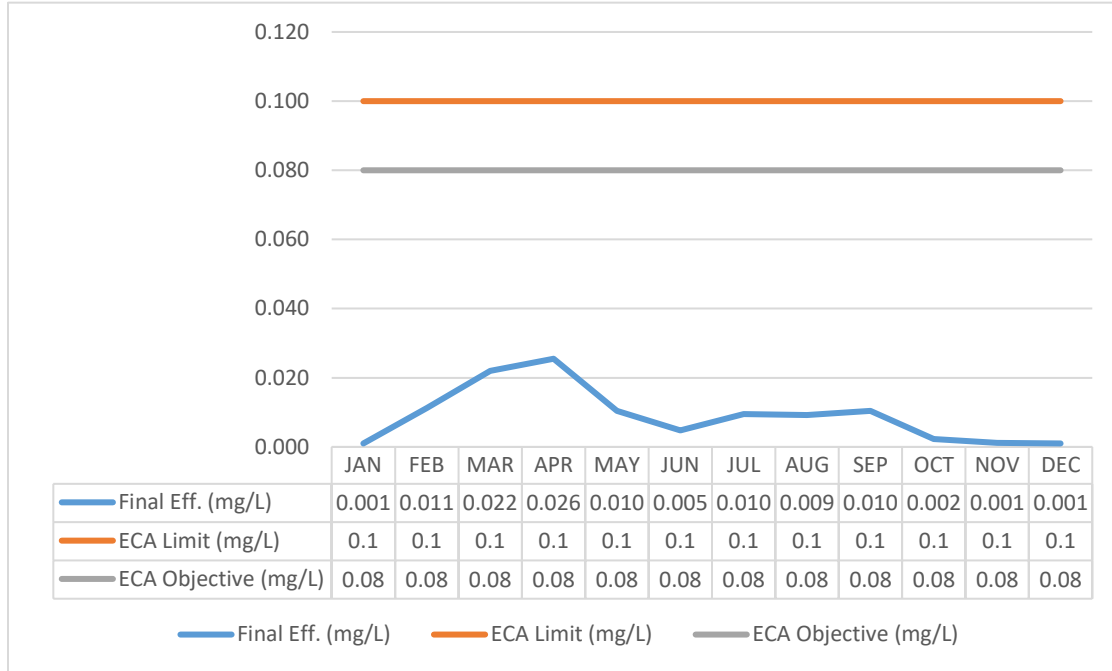
The Stirling Lagoon monthly average concentration for Total Suspended Solids (TSS) was maintained below the ECA limit of 10.0 mg/L and below the ECA Objective of 5.0 mg/L with the exception of March and April.

**Graph 8: 2022 Monthly Total Phosphorus (TP) Final Effluent Concentration Comparisons**



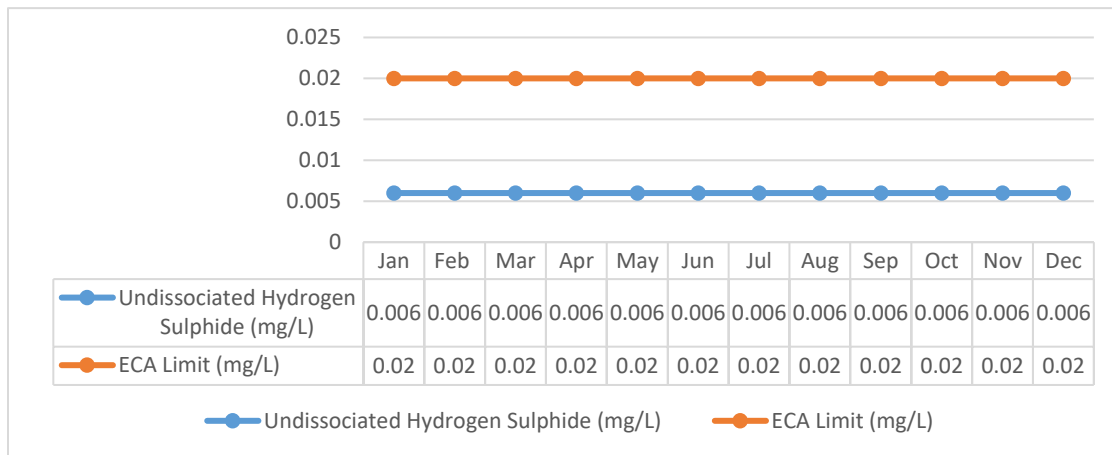
The Stirling Lagoon monthly average concentration for Total Phosphorus (TP) was maintained below the ECA limit of 0.3 mg/L however was slightly elevated above the ECA Objective of 0.1 mg/L as required as per Environmental Compliance Approval Number A-500-6126377731.

**Graph 9: 2022 Monthly Unionized Ammonia Final Effluent Concentration Comparisons**



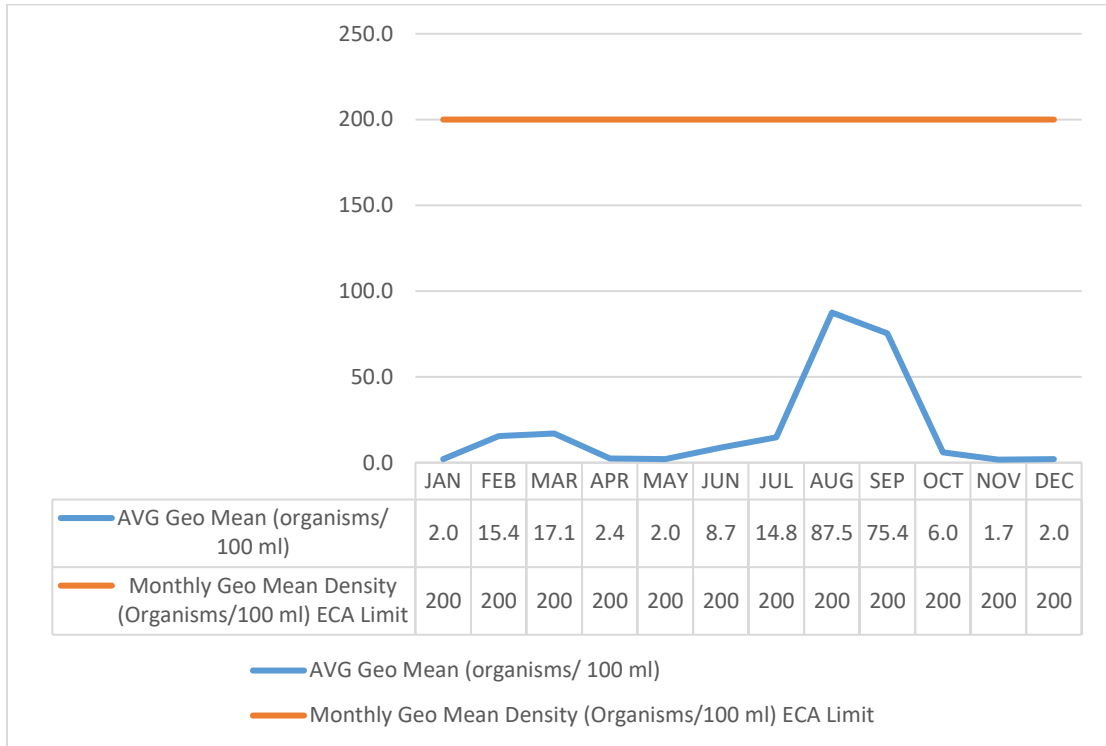
The Stirling Lagoon monthly average concentration for Unionized Ammonia (N-NH3) was maintained below the ECA limit of 0.1 mg/L and the ECA Objective of 0.08 mg/L as required as per Environmental Compliance Approval Number A-500-6126377731.

**Graph 10: 2022 Undissociated Hydrogen Sulphide Final Effluent Concentration Comparisons**



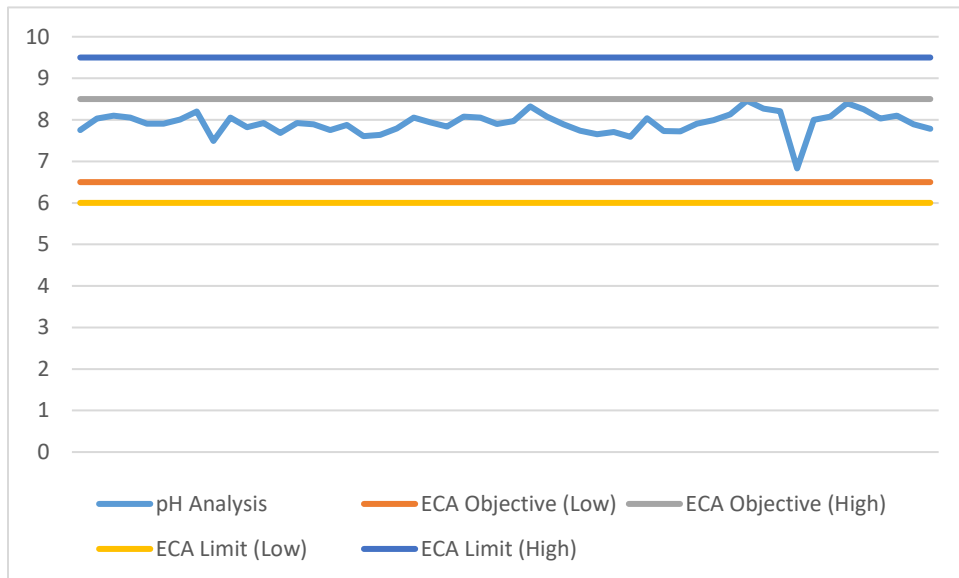
The Stirling Lagoon monthly average concentration for Undissociated Hydrogen Sulphide (H<sub>2</sub>S) was maintained below the ECA limit of 0.02 mg/L and the ECA Objective of Non-Detect as required as per Environmental Compliance Approval Number A-500-6126377731. The method detection limit for analysis at the laboratory is 0.006 mg/L.

**Graph 11: 2022 E.Coli Final Effluent Concentration Comparisons**



The Stirling Lagoon monthly geometric mean density for Escherichia Coli (E.Coli) was maintained below the ECA limit of 200 organisms/100 mL Monthly Geometric Mean Density as per Environmental Compliance Approval Number A-500-6126377731. The method detection limit for analysis is 2 organisms/100 mL.

**Graph 12: 2022 pH Final Effluent Concentration Comparisons**



The Stirling Lagoon pH was maintained within the ECA limit of 6.0 – 9.5. The pH was maintained within the ECA Objectives of 6.5 – 8.5 at all times.

C. a summary of all operating issues encountered and corrective actions taken;

Challenges	Corrective Actions
Upgrades and modifications to the George St Sewage Pumping Station and replacement of air release valves on the sewage force main to the lagoon.	Peak Construction installed three new submersible sewage pumps, two new coagulant pumps, PLC controls for operations, upgrades to electrical system, and complete replacement of all pipe work / valves in wet well. Installation of a new raw sewage flow meter and by-pass pumping chamber complete with new coagulant injection lances.
Sanitary sewer main installation on Henry St from George St. to West Front St. Sanitary Sewer installation on West Front St. from Henry St to North St.	QBT Excavating installed new sanitary sewer main and structures. By-pass pumping was conducted while replacement was being conducted.
Annis St. Pump # 2 submersible sewage pump drawing high current and tripping the breaker.	Pump was removed and inspected. The pump is currently awaiting rebuild and a spare pump was installed into service.
Frankford Road Sewage Pumping Station sewage force main blocked with debris.	A contractor was contacted to assist with flushing the sanitary force main.

On July 8, 2022 a nationwide cellular communications interuptence rendered the station alarming at Henry St, George St, Rodgers Dr. and the wastewater lagoon with no communications to the alarm company.	Staff monitored the stations until the communication issue was resolved.
On June 27, 2022 the electrical transformer at the Frankford Road Sewage Pumping Station failed	Staff monitored the station until a temporary replacement could be installed.
In July of 2022 one of the Variable Frequency Drives for the submersible sewage pumps at the Rodgers Drive Sewage Pumping Station malfunctioned.	Two new variable frequency drives were installed in August of 2022.

**d.** A summary of all normal and emergency repairs and maintenance activities carried out on any major structure, equipment, apparatus or mechanism forming part of the Works;

The Township of Stirling-Rawdon uses a work order tracking system that ensures facility maintenance and scheduled maintenance is scheduled on a weekly, monthly or annual basis. This ensures routine and preventative maintenance is carried out and assets are maintained to manufacturer’s and/or industry standards. In 2023 the Water and wastewater department will be transitioning to an electronic work order tracking and implementation software that will increase asset tracking and provide detailed maintenance summaries to assist with asset management and planning.

The upgrades to the George St Wastewater Pumping Station have increased wastewater capacity within the collection area as well as prolong the service life of the station by replacing critical components of the station. Additional upgrades to the wastewater collection system on Henry St and West Front St have eliminated bottlenecks within the collection system that were considered an issue with current flow rates and restricted development.

**e.** A summary of any effluent quality assurance or control measures undertaken; Effluent quality assurance is maintained in several ways. All samples collected during the reporting period required by the ECA sampling schedule were submitted to SGS Lakefield Research Ltd. Laboratory for analysis. SGS Lakefield Research has been deemed accredited by the Canadian Association for Laboratory Accreditation (CALA), meeting strict provincial guidelines including an extensive quality assurance/ quality control program. By choosing this laboratory, the Township of Stirling-Rawdon is ensuring appropriate control measures are undertaken during sample analysis. Sampling calendars are issued to operations staff to ensure sampling is conducted as per the ECA requirements. Analysis is reviewed regularly to ensure compliance with the ECA limits and objectives.

**f.** A summary of the calibration and maintenance carried out on all Influent, Imported Sewage and Final Effluent monitoring equipment to ensure that the accuracy is within the tolerance of that equipment as required in this Approval or recommended by the manufacturer;

The calibration on influent and effluent monitoring equipment was performed by Tower Electronics in 2022.

<b>Flow Meter Location</b>	<b>Date Calibrated</b>
Annis St Pumping Station Effluent	April 8, 2022
George St Pumping Station Effluent	April 8, 2022
George St Alum Flow Meter	April 8, 2022
Lagoon Pumped Final Effluent	April 8, 2022
Lagoon Gravity Final Effluent	April 8, 2022

**g.** A summary of efforts made to achieve the design objectives in the approval, including an assessment of the issues and recommendations for pro-active actions if any are required under the following situations:

**a.** When the design objectives is not achieved more that 50% of the time in a year, or there is an increasing trend in deterioration of Final Effluent Quality;

All Design objectives associated with ECA # A-500-6126377731 were achieved at least 50 % of the time in a year or better. During the 2022 reporting period an increase of Total Phosphorus concentrations was observed above the Objective Limit in the Final Effluent Quality for multiple months. Algae has become an issue in 2022 in the lagoons and operations staff have had to increase the Aluminum Sulfate Coagulant dosage to deal with phosphorus increases.

**b.** When the Annual Average Daily Influent Flow reaches 80 % of the Rated Capacity;

The Annual Average Daily Influent Flow for 2022 was 708 cubic meters which is 47.2% of the Rated Capacity of 1500 cubic meters per day.

**h.** A tabulation of the measured volume of sludge accumulated in the lagoon cells in five year intervals and the estimated volume in the interim years and when sludge was disposed of during the reporting period, a summary of disposal locations and volumes of sludge disposed at each location;

During the reporting period sludge was not removed from the North or South Lagoons.

Sludge primarily settles in the North Lagoon Inlet area where the raw sewage is introduced to the lagoon. It is estimated that between 500-700 cubic meters of sludge accumulates annually.

**i.** A summary of any complaints received and any steps taken to address the complaints;

There was one complaint received in the reporting period for the wastewater system. The issue was related to a loose sanitary structure lid on the roadway. The lid was replaced and the issue resolved.

j. A summary of all Bypasses, Overflows, other situation outside Normal Operating Conditions and spills within the meaning of Part X of EPA and abnormal discharge events;

**Bypasses:**

There were no bypasses at the Stirling Lagoon in 2022

**Overflows:**

There were no overflows at the Stirling Lagoon in 2022

**Situations outside Normal Operating Conditions**

During the summer Spring and Summer of 2022 contractors replaced submersible sewage pumps, slide rails, platforms, discharge piping, valves, flow meters, installed a PLC and coagulant pumps at the George St. Sewage Pumping Station. The Raw Sewage Flow Meter was removed from July 12, 2022-September 5, 2022. The raw sewage flows were estimated during the period when the flow meter was being replaced. During equipment replacement in the George St sewage wet well overland pumping was conducted to by-pass the wet well and direct sewage downstream of the station directly into the force main.

**K.** A summary of all Notice of Modifications to Sewage Works completed under Paragraph 1.d of Condition 10, including a report on status of implementation of all modifications;

On August 29, 2022 notification was sent to the MECP District Manager to inform him of commissioning activities at the George St Sewage Pumping Station.

**I.** A summary of efforts made to achieve conformance with Procedure F-5-1 including but not limited to projects undertaken and completed in the sanitary sewer system that result in overall Bypass/Overflow elimination including expenditures and proposed projects to eliminate Bypass/Overflows with estimated budget forecast for the year following that for which the report is submitted;

During the 2022 reporting period, there were no incidents of a bypass or overflow within the sanitary sewer system.

**m.** Any changes or updates to the schedule for the completion and commissioning operation of major process(es) / equipment groups in the Proposed Works;

The MECP was informed that the George St Pumping Station upgrades would be complete by June 24 2022. Due to supply chain issues and scheduling the substantial completion of the project was October 7, 2022 and the final completion was January 20, 2023.

**n.** A summary of any deviation from the monitoring schedule and reasons for the current reporting year and a schedule for the next reporting year;

In the reporting period of 2022 there was a new ECA issued on December 3, 2021 ECA Number A-500-6126377731 Version 1.1. A review of the ECA was requested by the Municipality in 2022 to address some concerns with the ECA conditions. The Municipality continued to conduct samples on Tuesdays as in the past until the ECA was amended. The ECA was amended on January 23, 2023 and is reflected in Version 2.0. In 2024 the Municipality will begin rotating sampling dates as required by the ECA.