

2023

Wastewater Performance Report

Township of Stirling-Rawdon



Reporting Period: January 1st- December 31st, 2023
Revision: 0

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;

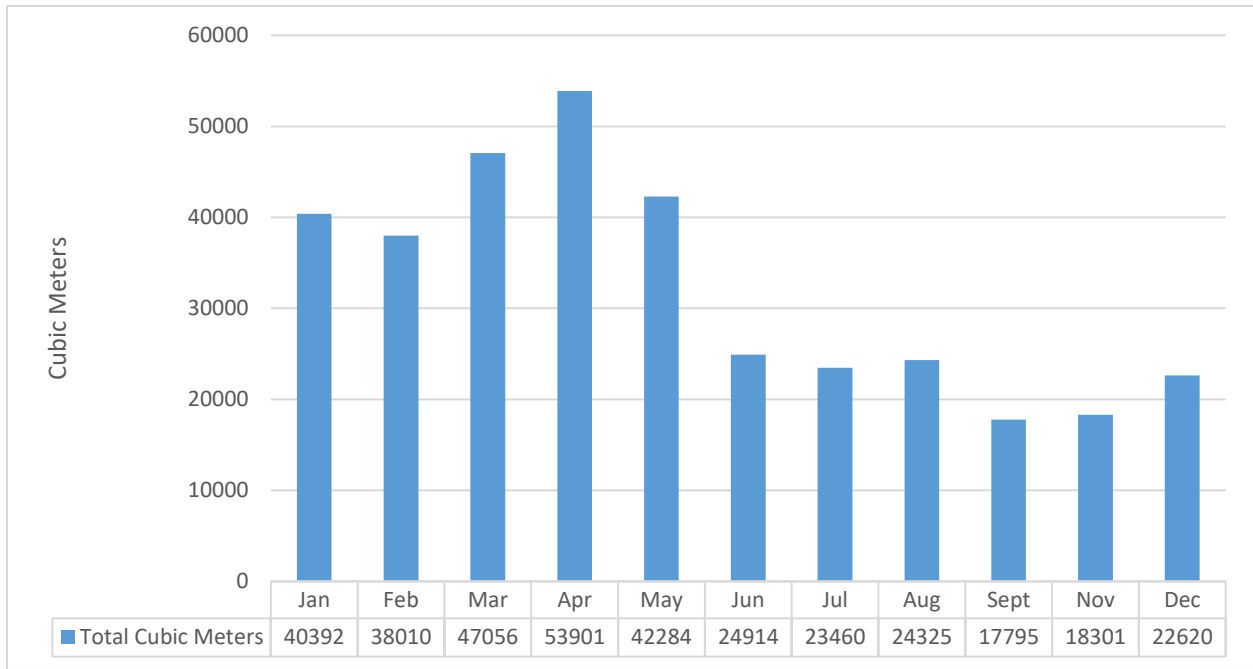
- k. a summary of all Notice of Modifications to Sewage Works completed under Paragraph 1.d of Condition 10, including a report on status of implementation of all modification;
- l. a summary of efforts made to achieve conformance with Procedure F-5-1 including but not limited to projects undertaken 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 2023. 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 m³/day and the 2023 annual average daily influent flow was 710 m³/day or 47.3 % of the Rated Capacity. The total influent flow in 2023 was 371,177 m³.

Graph 1: 2023 Influent Monthly Flow Totals



Graph 2: 2023 Influent Flows Daily Minimum, Maximum and Average Flows

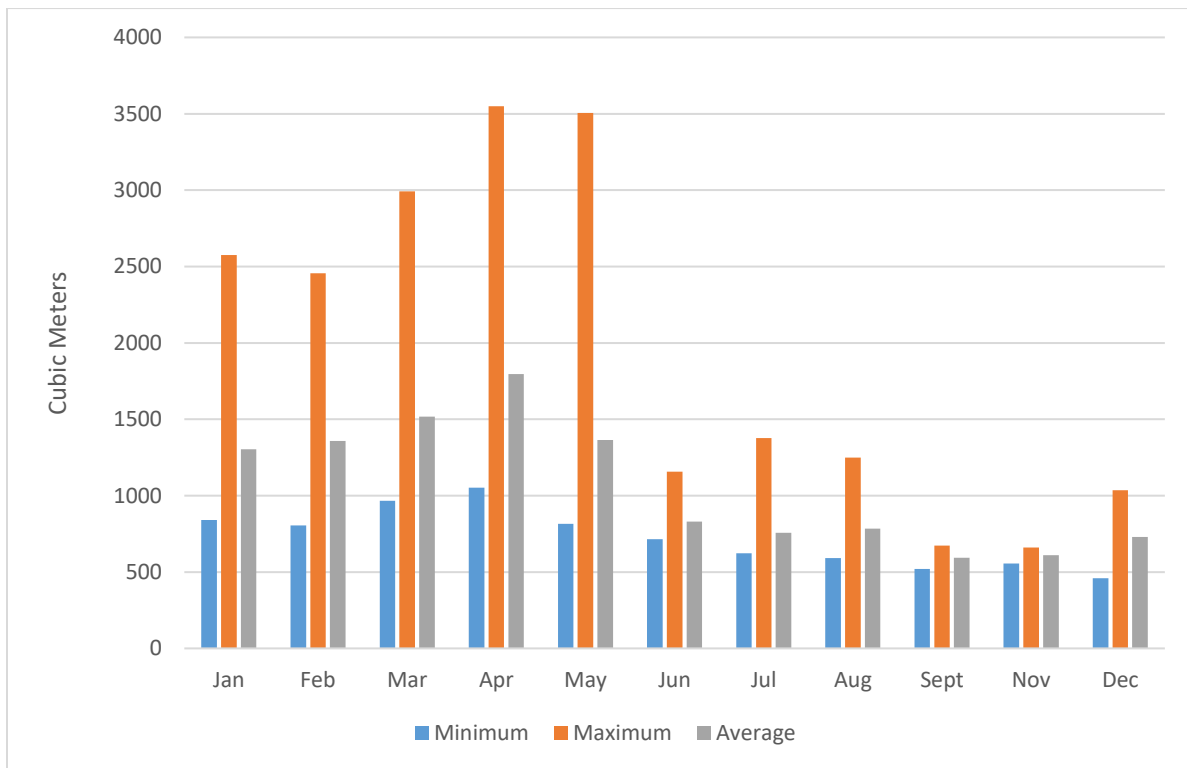


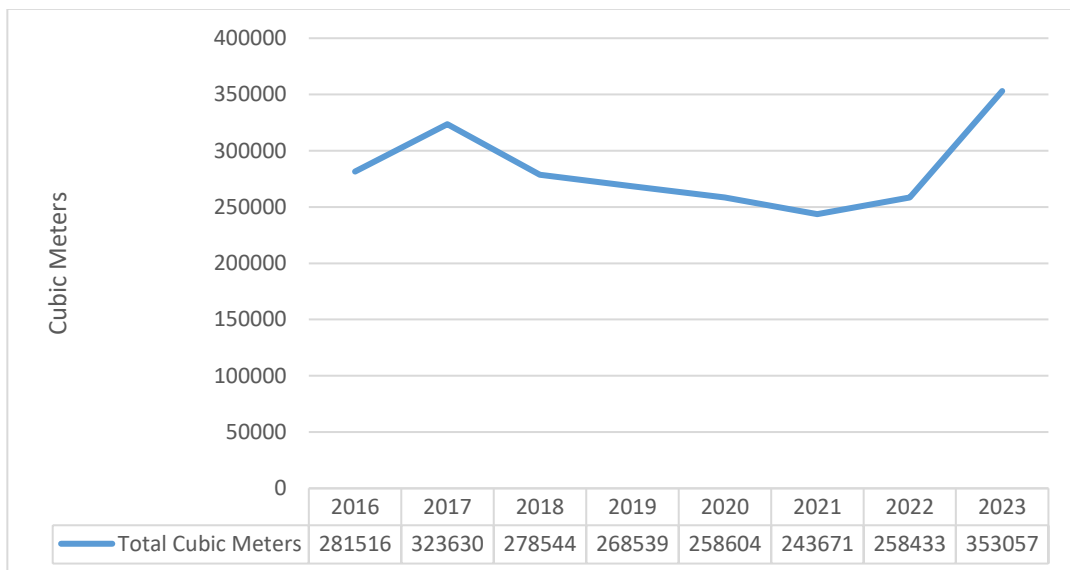
Table 1 reviews the historical trend of the influent sewage characteristics for the Stirling Lagoon, as required by Environmental Compliance Approval A-500-6126377731, Condition 11 (4) (a)

Table 1: 2016- 2023 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
2023	352.7	269.7	4.27	33.2

Table 1 shows that influent sewage nutrients have remained relatively constant since 2016.

Graph 3: 2016 – 2023 Historical Influent Flows for the Stirling Sewage Lagoon

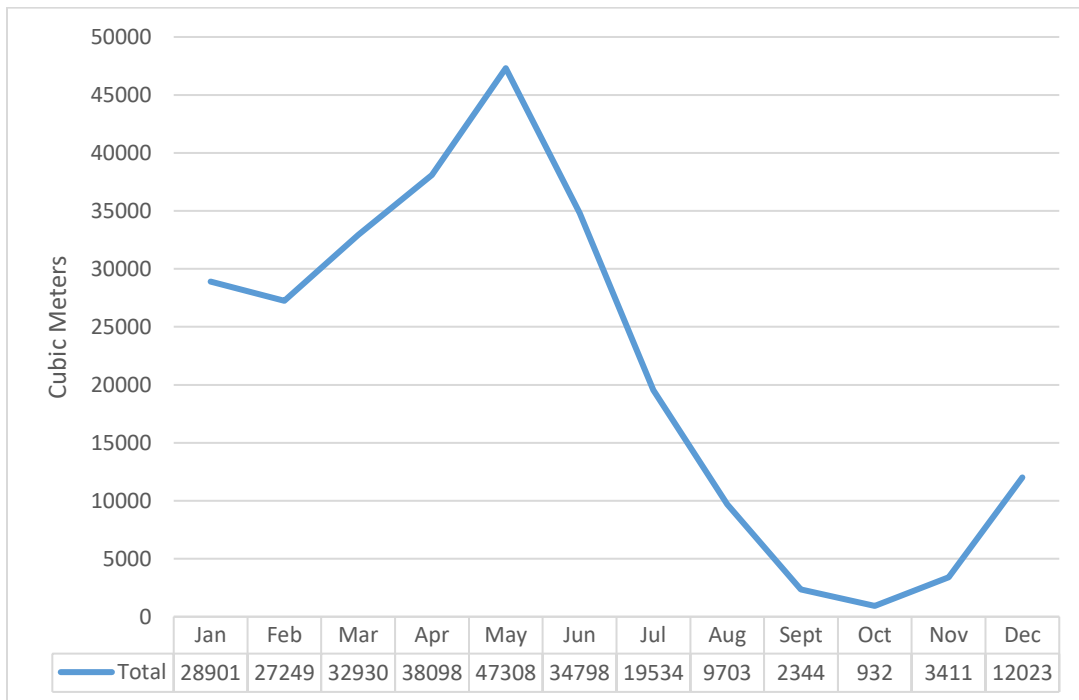


Graph 3 shows that the historical influent flows for the Stirling-Rawdon Lagoon since 2017 have been declining. The spike in 2017 can be attributed to the extremely wet spring season. The increase to 2023 can be attributed to higher than usual precipitation quantities.

- 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 2023 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: 2023 Final Effluent Monthly Flow Totals



Graph 5: 2023 Effluent Daily Minimum, Maximum and Average Flows

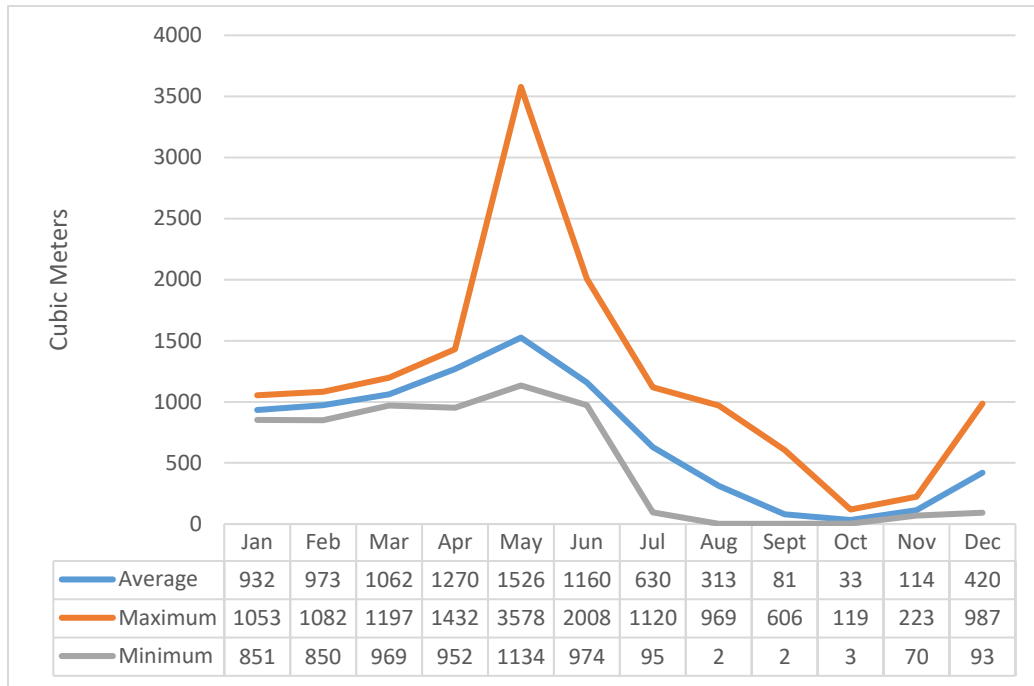


Table 2 outline effluent criteria limits as set out in Schedule C of the Environmental Compliance Approval Number A-500-6126377731.

Table 2: Stirling Sewage Lagoon- Final Effluent Compliance Limits 2023

Effluent Parameters	Average Effluent Concentration Limit (mg/L)	Actual Monthly Average Effluent Concentration (mg/l)	Compliant (Y/N)
CBOD5	10	2.3	Y
Total Suspended Solids	10	2.9	Y
Total Phosphorus	0.3	0.05	Y
Unionized Ammonia	0.1	0.013	Y
Undissociated Hydrogen Sulphide	0.02	0.006 (MDL 0.006)	Y

E.Coli	*200 organisms/100 ml Monthly Geometric Mean Density	12.59	Y
pH	ph to be maintained 6.0 to 9.5, inclusive, at all times	7.84	Y

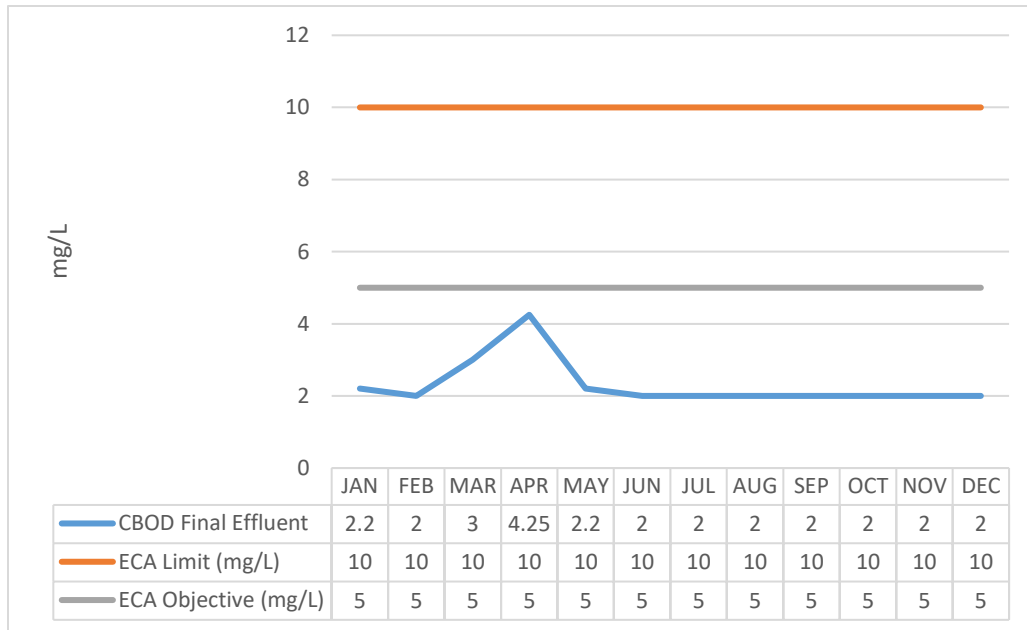
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Reporting**

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)
July 18, 2023	0	0	7.0	7.5	1180	260	22.0	0.20	0.014

During the reporting period of 2023 the Stirling Sewage Lagoon met the compliance limits prescribed in the Environmental Compliance Approval Number A-500-6126377731.

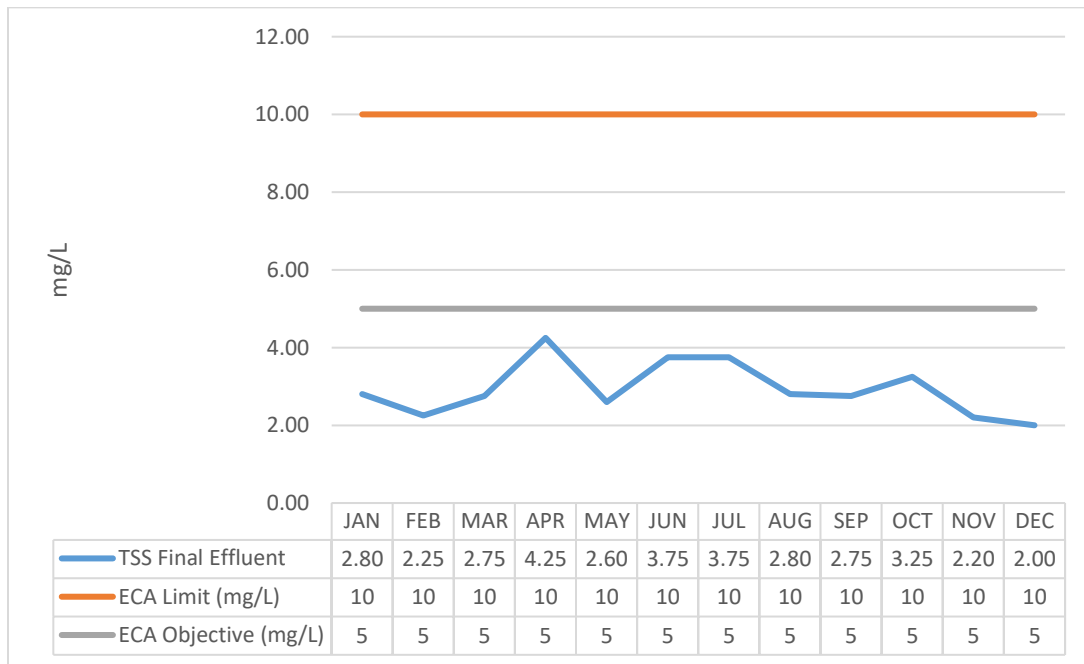
The requirement to report to Environment Canada for the 2023 reporting period is due by February 14th each year. Effluent limits were in compliance in 2023 for the acute lethality testing of Rainbow Trout and Daphnia Magna.

Graph 6: 2023 Monthly CBOD5 Final Effluent Concentration Comparisons



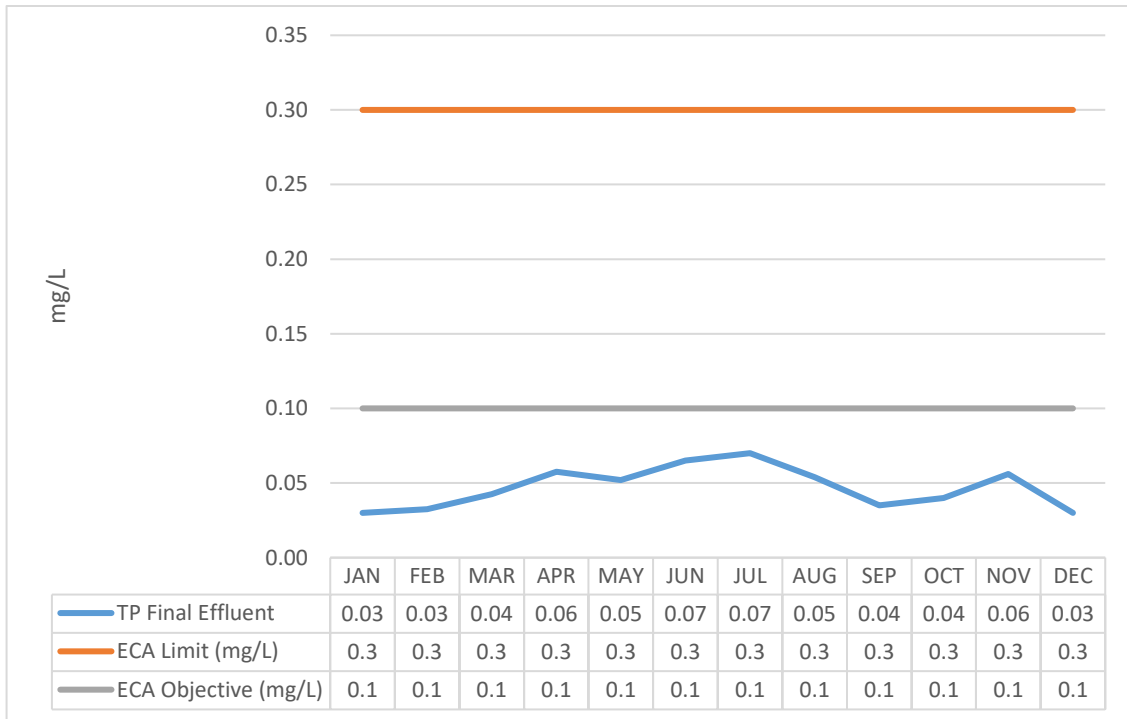
The Stirling Lagoon monthly average concentration for Carbonaceous Biochemical Oxygen Demand (CBOD5) was maintained below the ECA limit of 10.0 mg/L and below the ECA Objective of 5.0 mg/L.

Graph 7: 2023 Monthly TSS Final Effluent Concentration Comparisons



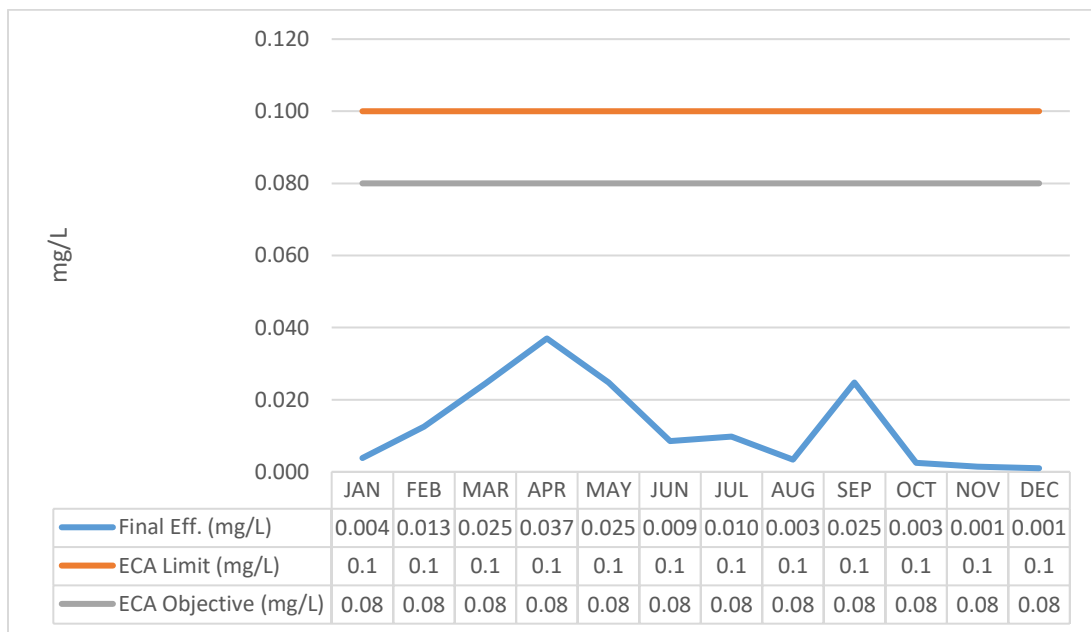
The Stirling Lagoon monthly average concentration for Total Suspended Solids (TSS) was maintained below the ECA limit of 10.0 mg/L and below the ECA Objective of 5.0 mg/L.

Graph 8: 2023 Monthly Total Phosphorus (TP) Final Effluent Concentration Comparisons



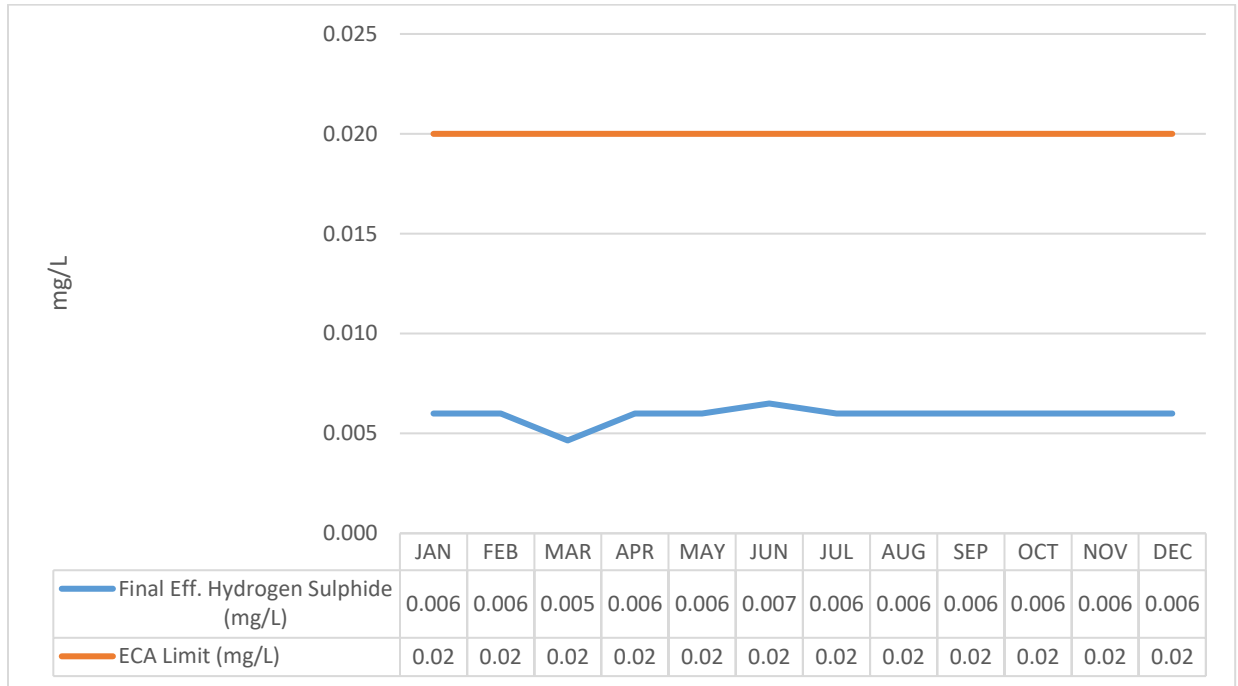
The Stirling Lagoon monthly average concentration for Total Phosphorus (TP) was maintained below the ECA limit of 0.3 mg/L and below the ECA objective of 0.1 mg/ as per Environmental Compliance Approval Number A-500-6126377731.

Graph 9: 2023 Monthly Unionized Ammonia Final Effluent Concentration Comparisons



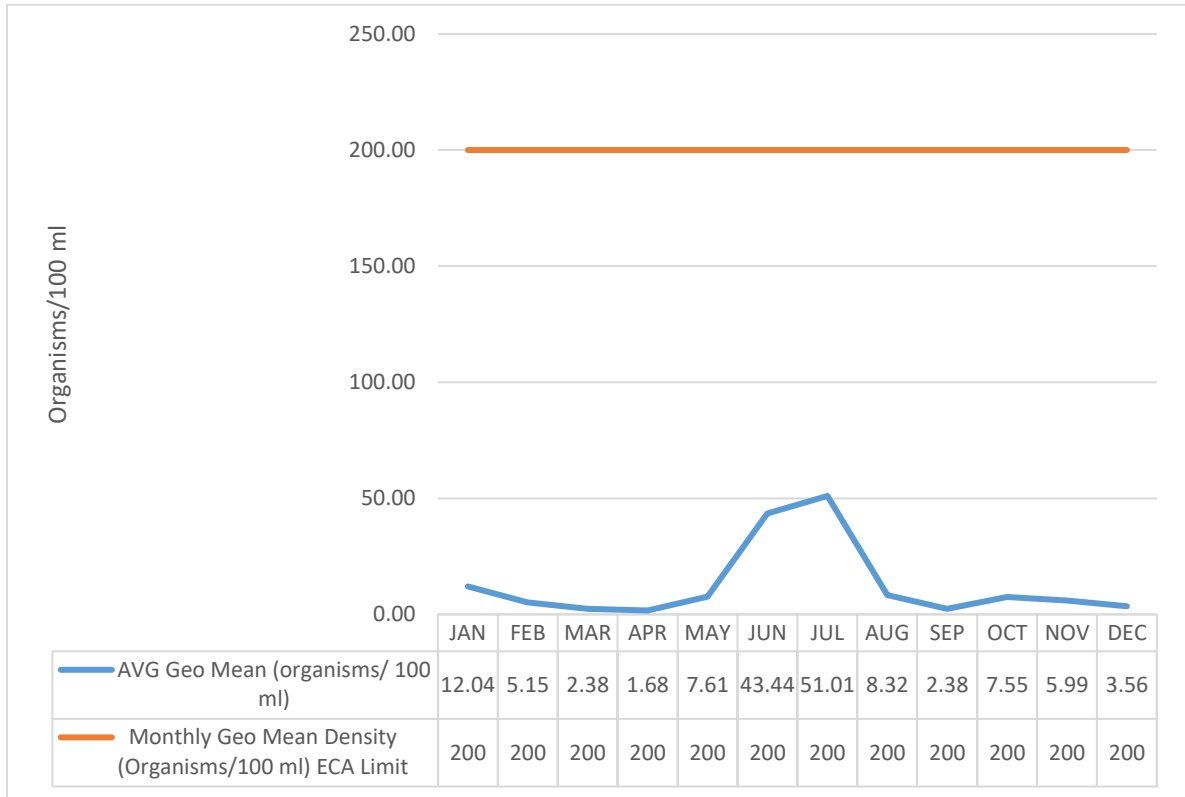
The Stirling Lagoon monthly average concentration for Unionized Ammonia (N-NH3) was maintained below the ECA limit of 0.1 mg/L and the ECA Objective of 0.08 mg/L as per Environmental Compliance Approval Number A-500-6126377731.

Graph 10: 2023 Undissociated Hydrogen Sulphide Final Effluent Concentration Comparisons



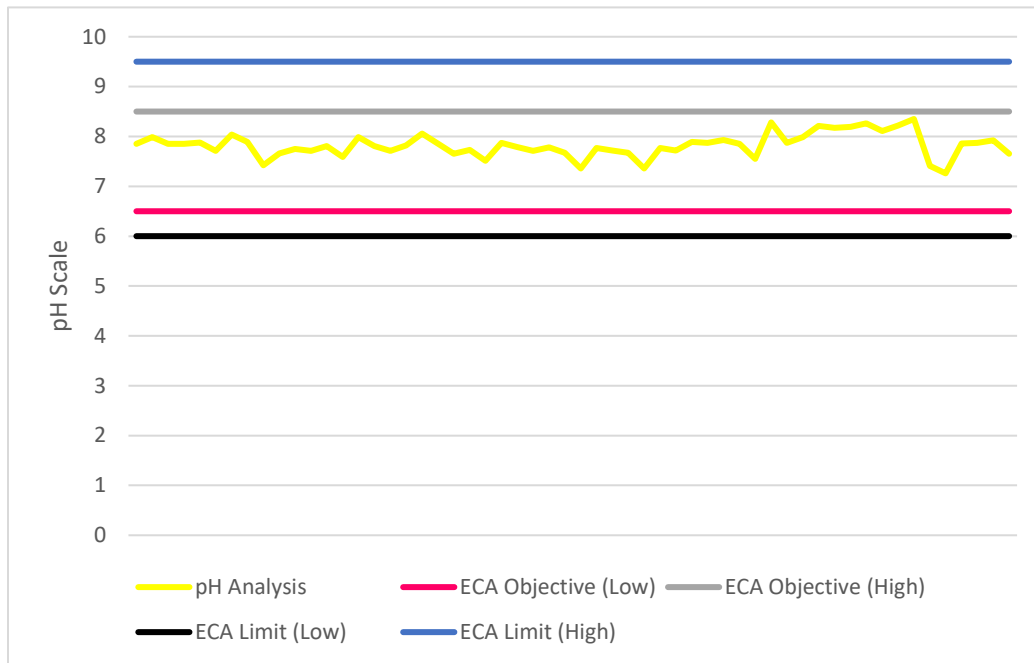
The Stirling Lagoon monthly average concentration for Undissociated Hydrogen Sulphide (H2S) was maintained below the ECA limit of 0.02 mg/L and the ECA Objective of Non-Detect with the exception of one sample on June 26, 2023 that was 0.008 mg/l. The method detection limit for analysis at the laboratory is 0.006 mg/L.

Graph 11: 2023 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: 2023 pH Final Effluent Concentration Comparisons



The Stirling Lagoon pH was maintained within the ECA limit of 6.0 – 9.5 and within the ECA Objectives of 6.5 – 8.5 at all times as per Environmental Compliance Approval Number A-500-6126377731.

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

Challenges	Corrective Actions
Sanitary sewer main installation on North St from West Front St to Victoria St and on Mill St from North St to James 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 2022.	Pump was removed and inspected in 2022. The pump was rebuilt by the manufacturer and the spare installed into operation 2023

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 2024 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.

Upgrades to the wastewater collection system on North St and Mill 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 2023.

Flow Meter Location	Date Calibrated
Annis St Pumping Station Effluent	April 17, 2023
George St Pumping Station Effluent	April 17, 2023
George St Alum Flow Meter	April 17, 2023
Lagoon Pumped Final Effluent	April 17, 2023
Lagoon Gravity Final Effluent	April 17, 2023

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.

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

The Annual Average Daily Influent Flow for 2023 was 1019 cubic meters which is 67.9 % 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 no complaints received in the reporting period for the wastewater system.

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 2023

Overflows:

There were no overflows at the Stirling Lagoon in 2023

Situations outside Normal Operating Conditions

There were no reported situations in the 2023 reporting year that were outside of normal operating conditions.

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;

There was no modifications to the sewage works completed as per paragraph 1.d of condition 10.

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 2023 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;

There were no changes or updates to schedule of completion and commissioning of major process, 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;

In the reporting period of 2023 there was a no deviation in the monitoring schedule.