



Warren Lagoon 2023



Annual Report

Warren Lagoon 2023 Annual Report

Version 1.0

Prepared by:

A Bilash

Andy Bilash
Manager of Wastewater Treatment

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Date

Approved by:

MPL

Michael Loken
Director of Water Wastewater Treatment &
Compliance

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Date

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Introduction to the Annual Wastewater Report

Under Environmental Compliance Approval (ECA) agreements issued by the Ministry of Environment, Conservation & Parks (MECP) the City is required to annually report on the values/parameters indicated in the ECA and made available to the District Manager by March 31st of the calendar year following the period being reported upon. Specifically, the Warren Lagoon annual report is to include:

- a) a summary of all monitoring data, including an overview of the success and adequacy of the Works.
- b) a description of any operating problems encountered, and corrective actions taken.
- c) a summary of all maintenance carried out on any major structure, equipment, apparatus, mechanism, or thing forming part of the Works.
- d) a description of efforts made, and results achieved in meeting the Effluent Objectives of the Approval.
- e) a summary of any complaints received during the reporting period and any steps taken to address the complaints.
- f) a summary of all by-passes, plant overflow, overflow, spill or abnormal discharge events.

To address these requirements, this report contains the following sections.

Lagoon Performance Report; Monthly results and parameters, including a graphical representation of flows through the plant.

Operating Issues & Corrective Actions; Measured values resulting in a non-compliance with respect to a parameter listed within an ECA and the corrective actions taken to resolve the issue.

Maintenance & Capital Improvements; All major maintenance, modifications and capital works completed at the lagoon within the reporting period. Details on the calibration and maintenance carried out on all effluent monitoring equipment.

Effluent Quality & Control Measures; A summary and interpretation of all monitoring data collected and a comparison to the parameters and limits given in the ECA for each facility.

Customer Complaints; Any complaints received regarding the Warren Lagoon through the City of greater Sudbury 311 system during the reporting period and any steps taken to address the complaints.

Plant Bypasses and Overflows; A listing of all bypasses, spills, and overflows at the lagoon during the reporting period.

Definitions

Alkalinity: a measurement of the ability of water to neutralize acid by absorbing hydrogen ions.

Average Concentration: the mean of all Single Sample Results of the concentration of a contaminant in a given stream (influent/effluent) measured during a specified time period.

Average Flow: the cumulative total influent or effluent flow measured during a defined time period (annual, monthly, etc.) divided by the number of days during that specified period.

Average Loading: the value obtained by multiplying the Average Concentration of a contaminant in a given stream (influent/effluent) by the Average Flow for that stream.

BOD₅: the five-day biochemical oxygen demand measured in an unfiltered sample and includes carbonaceous and nitrogenous oxygen demands.

Bypass: the diversion of sewage around one or more treatment processes, excluding Preliminary Treatment System, with the diverted sewage flows being returned to the Sewage Treatment Plant treatment train upstream of the Final Effluent sampling point(s) and discharged via the approved effluent disposal facilities.

cBOD₅: the five-day carbonaceous biochemical oxygen demand of biological organisms in the material, without the impact of oxygen depletion by nitrogenous bacteria.

E. coli: coliform bacteria that possess the enzyme beta-glucuronidase and can cleave a fluorogenic or chromogenic substrate with the corresponding release of a fluorogen or chromogen, that produces fluorescence under long wavelength (366 nm) UV light, or color development, respectively. Data are reported as colony forming units (CFU) per 100 mL.

Event: an action or occurrence, at a given location within the Works that causes a Bypass or Overflow. An Event ends when there is no recurrence of Bypass or Overflow in the 12-hour period following the start of the event.

Final Effluent: effluent that is discharged to the environment through the approved effluent disposal facilities, including all Bypasses, that are required to meet the compliance limits stipulated in the Approval for the Sewage Treatment Plant at the Final Effluent sampling point(s).

Influent: flows to the Sewage Treatment Plant from the collection system. Flows can fluctuate according to weather conditions and high flows are commonly due to Inflow and Infiltration, a condition that allows rain and/or snow melt to enter the sanitary sewer.

Monthly Geometric Mean Density: the mean of all Single Sample Results of *E. coli* measurement in the samples taken during a calendar month, calculated, and reported as per the methodology specified by the MECP.

Nitrite: the amount of nitrogen present in the effluent as the NO₂⁻ anion.

Nitrate: the amount of nitrogen present in the effluent as the NO₃⁻ anion.

Overflow: a discharge to the environment at location(s) other than the approved effluent discharge.

pH: the potential of hydrogen measured on a 14-point scale where 0 represents highly acidic material, 14 represents highly basic material and 7 represents neutral material (such as water).

Rated Capacity: The Annual Average Daily Influent Flow for which the facility is designed to process.

T Amm: the total ammonia measured in the final effluent.

TKN: Total Kjeldahl Nitrogen; the total concentration of organic nitrogen & ammonia in the effluent.

TP: Total Phosphorous; the total amount of phosphorous measured in the final effluent.

TSS: Total Suspended Solids; the total amount of residual solid matter in the final effluent.

Un-ionized Amm: the calculated amount of un-ionized ammonia in the final effluent.

Sludge: the residual material produced through the wastewater treatment process.

WSER: Wastewater Systems Effluent Regulations, as defined in the Fisheries Act

Lagoon Performance Report

The Warren Lagoon is subject to semi-annual discharges. Discharging is done in the spring and fall as follows:

Spring: discharge commencing after the liquid surface in the lagoon has become free of ice cover, terminating within 60 days thereafter, and continuing for not less than 15 days for each lagoon cell released.

Pre-Discharge Sampling	
SPRING	EAST CELL
Date	May.16/23
CBOD5 (mg/L)	4.0
TSS (mg/L)	17.30
TP (mg/L)	0.589
TAN (mg/L)	2.12
pH	8.5
H ₂ S (mg/L)	NA
TKN (mg/L)	3

Spring Effluent Discharge - East Cell #2						
Date	May.26/23	May.29/23	Jun.2/23	Jun.7/23	Jun.12/23	Seasonal Average
Depth					End	
CBOD5 (mg/L)	7.4	7.5	5.5	11.7	7.8	8.0
TSS (mg/L)	26.7	22	11.00	24.3	15.0	19.8
TAN (mg/L)	0.21	0.01	0.08	0.01	0.5	0.2
TP (mg/L)	0.603	0.212	0.145	0.232	0.4	0.3
pH	8.97	9.08	9.5	9.1	8.4	9.0
E.Coli	10	2	2.00	56.00	4.0	14.8
BOD5	10	12	6.6	16	6.3	10.2
TKN	7	29	0.7	15	1.0	10.5
Nitrite as N	0.05	0.05	0.05	0.05	0.1	0.1
Nitrate as N	0.05	0.05	0.05	0.05	0.1	0.1

Approx Spring Discharge Vol	41,318	m3
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Fall: discharge commencing not earlier than October 15 and terminating not later than November 30 and continuing for not less than 15 days for each lagoon cell released.

Pre-Discharge Sampling		Fall Effluent Discharge - West Cell #1			
FALL	West Cell	Date	Oct.26/23	Oct.30/23	Seasonal Average
Date	Sep27-Oct19	Depth	Beginning	End	
CBOD5 (mg/L)	3.5	CBOD5 (mg/L)	1.0	3.2	2.1
TSS (mg/L)	14.30	TSS (mg/L)	3.7	100	51.9
TP (mg/L)	0.708	TAN (mg/L)	2.77	2.80	2.8
TAN (mg/L)	2.40	TP (mg/L)	0.610	0.671	0.6
pH	NA	pH	NA	NA	NA
H ₂ S (mg/L)	NA	E.Coli	72	326	199
TKN (mg/L)	3.3	BOD5	1.4	5	3.2
		TKN	3.2	4.1	3.7
		Nitrite as N	0.15	0.1	0.1
		Nitrate as N	0.15	0.1	0.1

Approx. Fall Discharge Vol	30,698 m3
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Annual Results:

	Spring	Fall	C of A Limits	Annual Avg	FED Limit
CBOD5 (mg/L)	8.0	2.1	30	6.3	25
TSS (mg/L)	19.8	51.9	40	29.0	25
TP (mg/L)	0.3	0.6	1	0.45	NA

Influent Flow Data						
Design Capacity:			1,246 m ³ /day 593 m ³ /day			
Month	Raw Flows (Act meter)		Raw			
	Total	Avg Day	CBOD5	TSS	TP	BOD
	m ³	m ³ /d	mg/L	mg/L	mg/L	mg/L
Nov-22	5343	178	200	114	5.0	190
Dec-22	5407	174	150	120	4.0	170
January	5051	163	160	136	4.2	170
February	4603	164	61	70	1.9	70
March	6344	205	130	104	4.9	120
April	14570	486	59	146	1.9	170
May	9189	296	140	226	3.5	170
June	4558	152	150	142	4.0	170
July	4201	136	130	115	3.8	170
August	3759	121	110	108	5.1	230
September	3319	111	110	112	5.4	120
October	5672	183	150	63	4.3	140
November	6292	210	90	82	2.1	110
December	4856	157	160	125	3	170
Total	72414		1450	1429	44	1810
Average	6035	199	117	119	3.68	151
Q1 RAW	15998		117	103	3.7	120
Q2 RAW	28317		116	171	3.1	170
Q3 RAW	11279		117	112	4.8	173
Q4 RAW	16820		133	90	3.1	140
Spring Raw Flows	41318					
Fall Raw Flows	30698					

Operating Issues & Corrective Actions

Date	Non-Compliance	Root cause	Corrective Action Plan	Date Reported to Ministry
Nov 10, 2023	No sample collected at end of fall release	Lagoon froze over, unable to control level	Monitor Lagoon more often	Jan 10, 2024

Maintenance & Capital Improvements

The calibration of flow meter at the Warren lift station was conducted by Induscontrols in accordance with the requirements of the Warren Certificate of approval. Records and certificates are kept electronically.

The operating and maintenance staff for the Warren Lagoon and Lift station conducts scheduled and emergency maintenance of the equipment. The City of Greater Sudbury utilizes a database system known as Antero to issue work orders and maintain records for regular maintenance and emergency repair.

Effluent Quality & Control Measures

The City of Greater Sudbury's Supervisory Control and Data Acquisition (SCADA) system records influent flow from the Warren lift station. Samples are collected and sent out to a third-party lab for analysis. Lagoon reports contain flow and lab results for supervisors to review. Data is then transferred to monthly and annual performance reports ensuring that all information is accounted for reviewed.

Twice a year, prior to seasonal discharge, lagoon samples are collected and tested for total phosphorus (TP). If TP levels are high, chemical addition is used to treat the lagoon before discharge. This reporting year only the fall discharge required chemical treatment.

Customer Complaints

The City of Greater Sudbury received no complaints for this reporting year.

Plant Bypasses and Overflows

There were no bypasses or overflows reported for the lagoon or lift station for this reporting year.