Township of North Glengarry

Maxville Wastewater System

2024 Annual Report

Contents

A. System Overview

Summary of all system components and designations.

The Maxville wastewater system is owned an operated by the Corporation of the Township of North Glengarry. The sewage system is comprised of a class 2 collection system and a class 1 seasonal discharge lagoon system. It was originally constructed in the late 1980's, with minor extensions throughout the years to meet the village population growth.

The wastewater systems now operate under 2 Environmental Compliance Approvals (ECA). ECA 181-W601, issued in October 2023 for all municipal sewage collection systems located within the North Glengarry Township boundaries and ECA 5368-8PPQA2, issued in 2012 for the Maxville Sewage Lagoons.

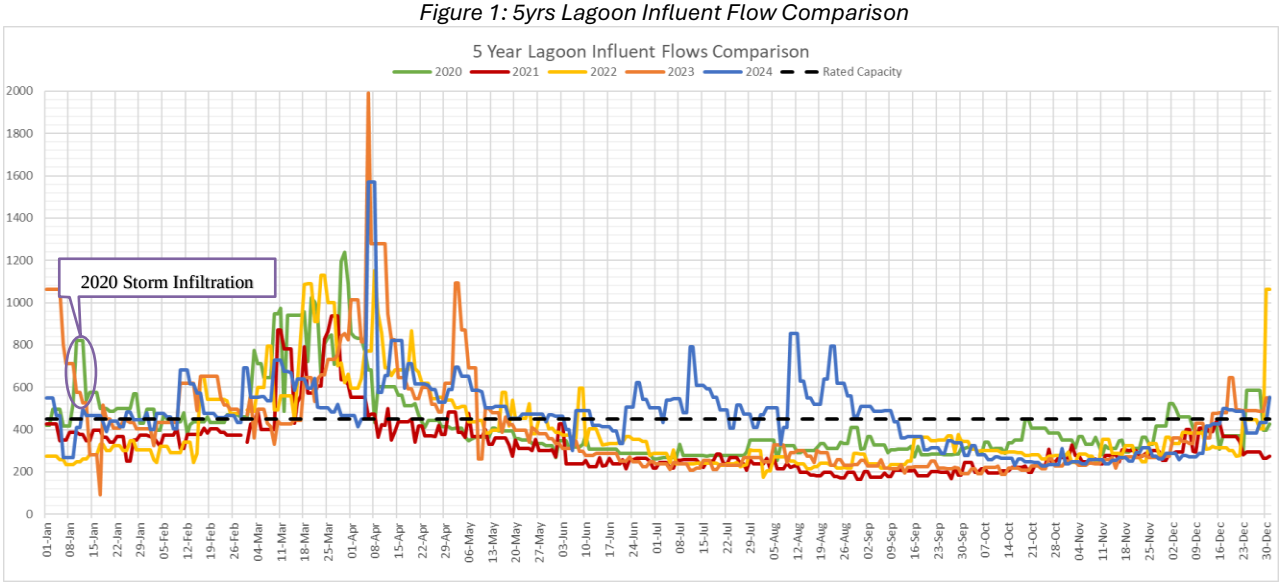
The collection system is comprised of approximately 12.0kms of sanitary sewage collection piping and force mains of various sizes, with approximately 445 service connections, one sanitary lift station and one main pumping station. The treatment system is comprised of a conventional facultative lagoon system with a coagulant addition system dosing into the influent chamber, two treatment cells that run in parallel, and a discharge chamber. The lagoons are discharge annually in the spring to coincide with the peak spring flows of the west branch of the Scotch River. At the influent chamber the wastewater is directed into one of the two cells, with an annual rotation of slide gates to ensure that over a 2-year period both cells receive influent sewage. Between the two cells an interconnecting valve and piping is left in the open position, so cell levels are equalized throughout the year. The wastewater is treated through natural biological means prior to discharge.

B. Performance Assessment

Summary and interpretation of all monitoring data collected in accordance with condition 10 and a comparison to the effluent limits outlined in condition 7, including an overview of the success and adequacy of the works.

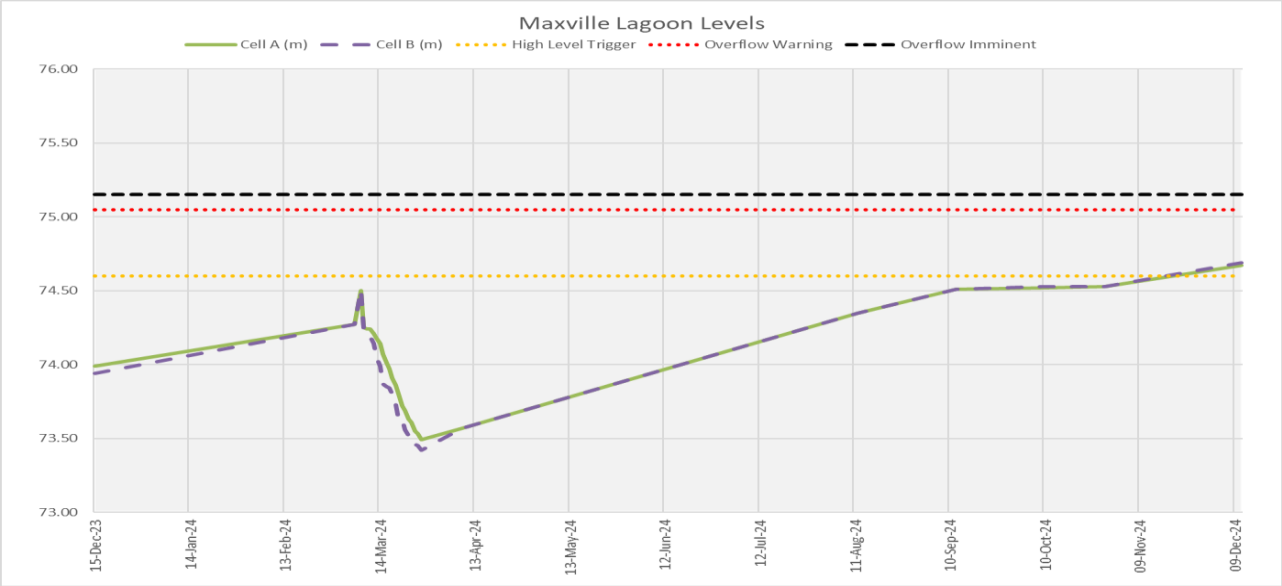
During the 2024 calendar year, 171,220m^3 of untreated raw sewage was directed to the Maxville Lagoon system for treatment, based on the metered flow at the influent piping prior to the influent structure. This raw sewage is mainly comprised of residential and commercial waste from the village of Maxville. The influent flows were found to be higher than the previous year's flows, possibly caused by higher-than-normal flows during the summer months (Jun-Sep). This trending is in-line with previous findings of steadily increasing since 2018, which is concerning as there has been limited growth within this system during this period. There was no additional effluent sewage sources into the system throughout this calendar year.

Figure 1: 5yrs Lagoon Influent Flow Comparison



The figure below displays the lagoon cell levels as measured throughout 2024. The top of the berm is represented by 76.00m and the bottom of the lagoon cell is represented by 73.00m. The levels were taken from each cell daily during the seasonal discharge and at least monthly outside of the discharge period when the cells were not covered by ice. A high-water level trigger has been set at 76% capacity or 74.60m, at which point the township will implement a contingency plan to prevent overflow. The only issues identified during the 2024 period, was a cell level discrepancy noted during the Spring Discharge caused by a minor blockage in the equalization piping and increasing sewage levels noted about the High-Level Trigger starting in December. Due to the high-level trigger exceedance in December, an inflatable plug was installed into the cell B overflow pipe as a precaution due to increasing levels. The operators are continuing to monitor and determine if more action will be required prior the discharge period.

Figure 2: Annual Lagoon Levels



i. Raw Sewage Monitoring

Condition 10 (3) of the ECA requires monthly raw sewage sampling at the Main Station for $CBOD_5$, Total Suspended Solids (TSS) and Total Phosphorus (TP). All sampling was completed as per conditions listed above; no additional samples were taken during 2024. Although the results have slightly varied from previous years for most parameters, the sewage strength appears to be consistent with previous finding indicating not much variation in the inflowing sewage strength. Overall, in the last 5 years the TSS appears to be steadily increasing, where TP and BOD_5 are fairly consistent. Please refer to Appendix A for a full summary of the raw quality analysis.

Table 1: Annual Average Raw Sewage Monitoring Comparison

Year	Annual Average Result				
	2020	2021	2022	2023	2024
BOD_5	81.8 mg/L	75.5 mg/L	104.6 mg/L	183.1 mg/L	83.9 mg/L
TSS	359.9 mg/L	355.5 mg/L	201.4 mg/L	170.5 mg/L	127 mg/L
TP	4.40 mg/L	5.27 mg/L	4.22 mg/L	4.12 mg/L	3.92 mg/L

ii. Pre-Discharge Monitoring

Condition 10(3) of the ECA requires the sampling and analysis of BOD_5, TSS and TP in each lagoon cell 14 days prior to discharge commencement, which is performed to ensure that the effluent limits of each parameter are met prior to discharge. The table below summarizes the dates samples were taken and sample results within the 14-day period. In 2024 a total of 2 sets of samples were taken prior to the

commencement of the discharge, all results indicated effluent sewage did not require additional treatment prior to discharge.

Table 2: Pre-Discharge Sampling Summary

Sampling Locations	Cell A			Cell B		
Effluent Parameters (mg/L)	BOD_5	TSS	TP	BOD_5	TSS	TP
ECA Effluent Limit (mg/L)	30	30	1	30	30	1
27-Feb-2024	9	27	0.36	14	25	0.41
28-Feb-2024	12	20	0.32	14	20	0.28

iii. Spring Discharge Monitoring

The 2024 annual spring discharge was a non-stop flow over 20-day period, within a calculated 457.1hrs. The discharge was started on Friday March 8, 2024 and was shut down on Wednesday March 27, 2024, with a total effluent volume of 163,307m^3 discharged into the West Branch of the Scotch River. Throughout the discharge, daily flow monitoring was completed to ensure the flows remained within the allowable 3:1 mixing ratio.

Table 3: Discharge Flow Summary

Date	Start Time	Total hours	River Flow (m^3/s)	Discharge Rate (m^3/s)	Mixing Ratio (3:1)	Discharge Amount (m^3)
	(from Sting Ray)	(calculated)	(calculated)	(calculated)	(calculated)	(from Sting Ray)
08-Mar-2024	8:52		0.795	0.125	6.36 :1	
09-Mar-2024	8:56	24.06	0.451	0.115	3.92 :1	9,425.66
10-Mar-2024	8:52	24.93	2.727	0.100	27.27 :1	4,782.77
11-Mar-2024	11:00	26.13	1.107	0.105	10.54 :1	8,908.10
12-Mar-2024	9:14	22.23	0.831	0.135	6.16 :1	8,047.69
13-Mar-2024	8:40	23.43	0.566	0.145	3.90 :1	10,634.20
14-Mar-2024	8:52	24.20	0.466	0.130	3.58 :1	11,929.65
15-Mar-2024	9:11	24.32	0.351	0.105	3.34 :1	11,496.87
16-Mar-2024	8:57	23.77	0.424	0.110	3.85 :1	8,910.39
17-Mar-2024	9:09	24.02	1.220	0.110	11.09 :1	9,294.78
18-Mar-2024	10:01	24.86	0.845	0.150	5.63 :1	9,635.39
19-Mar-2024	9:30	23.48	0.525	0.150	3.50 :1	11,822.67
20-Mar-2024	8:30	23.00	0.245	0.074	3.31 :1	11,622.20
21-Mar-2024	10:54	26.40	0.425	0.130	3.27 :1	7,054.58
22-Mar-2024	8:57	22.05	0.293	0.090	3.26 :1	10,285.05
23-Mar-2024	9:04	24.70	0.207	0.063	3.29 :1	8,288.61
24-Mar-2024	9:44	24.66	0.355	0.105	3.38 :1	5,427.31
25-Mar-2024	8:38	22.90	0.080	0.025	3.20 :1	8,378.84
26-Mar-2024	8:19	23.68	0.216	0.065	3.32 :1	2,437.93
27-Mar-2024	8:34	24.25	0.226			4,924.36

Condition 10(2) of the ECA requires that during the discharge the lagoon effluent is to be sampled at a minimum of 4 times per cell based on the % draw down. Samples are to be collected at the start of the discharge, at 33%, at 67% and on the final day. During the 2024 discharge, samples were collected 4 times from a single point at the discharge outfall, as the cell discharges are blended before being released. The effluent discharge was also tested for acute lethality, as per federal requirements. There was one exceedance for TSS at the beginning of the sampling period, although the average did not exceed the provincial limits. Please refer to section 7 and Appendix A for further information.

C. Groundwater and Surface Water Monitoring

Summary and Interpretation of all groundwater monitoring data

Condition 10(3) of the current ECA addresses the requirements of the monitoring program. Sampling is to be performed annually, semi-annually or three times per year depending on the parameter, as per Table 6-Groundwater Monitoring and Table 7-Surface Water Monitoring. JP2G Consultants in association with the Greer Galloway Group was retained by the Township to complete the annual monitoring program for the Maxville lagoon system. An annual report is submitted to the Ministry of Environment and to the Township upon completion each calendar year.

As per the 2023 report, *the groundwater flow direction is east-northeast, consistent with historical findings and results indicate that the lagoons are having some impacts on the groundwater in the area. However, the results were well within the compliance requirements of the MOECC B-7 guideline and no potable groundwater users are within the area immediately downgradient of the site. The surface water results indicated the lagoons do not appear to have significantly impacted the water quality in the West Branch of the Scotch River and the results observed in river were significantly outside the concentrations measured in the eastern cell of the lagoons*.

D. Operational Problems

A description of any operating problems encountered and corrected

Collection System:

- Intermittent sewage pump failure due to debris in wet well.
  - pulled pump and removed debris from pump impeller as required and placed back in service.
- Sewage pump taken out of service from Manor Station due to on-going electrical issues.
  - pump removed from January until October.
  - pump was replaced with new unit and only placed into service once new panel was installed in October.
- Repair to utility Bell servicing to restore alarm panel operation.
  - Manor Station repair completed in April.
  - Main Pumping Station completed in December.
- Intermittent wet well sensor issues
  - Main Pumping Station level sensor was cleaned and moved due to defective operation (July).
  - Manor Station level sensor operational issues caused by excessive foam in wet well causing echo loss (October-December).

Treatment System:

- Noted lagoon cell levels offset during annual discharge indicating possible blockage in interconnected piping.
  - contractor flushed piping to clear obstruction after annual discharge was competed.
- During influent structure inspection, noted that influent piping into cell A was blocked.
  - contractor flushed lines and removed obstructions.

E. Maintenance

Summary of all maintenance carried out on any major structure, equipment, apparatus, mechanism or thing forming part of the Works

Collection System:

- Annual generator maintenance in March.
- Annual lifting device inspection in January.
- Annual inspection of force main signage and repair/replacement as required In October.
- Annual Wet Well cleaning and inspection completed in April.

- Monthly emergency generator testing as scheduled, no issues noted.
- Monthly alarm signal testing, as scheduled.
- Monthly pest control monitoring, no issues noted.
- Installed new control panel and SCADA System at Manor Station for pump control and trending purposes in October.
- Manor Station Hydro Meter was replaced by Hydro One in May.
- Manor Station back-up float system installed in October.

Treatment System:

- Annual flow meter calibration in April 2024
- Annual Influent chamber and piping cleaned and inspected.
- Monthly battery bank and generator inspection and maintenance completed as scheduled.
- Monthly pest control monitoring, no issues noted
- Removed vegetation growth inside berms as required.

F. Effluent Quality Control and Assurance

Summary of any effluent quality assurance or control measures undertaken in the reporting period

All sampling was performed within provincial guidelines by licensed operators, as per internal SOP's. Sampling schedules with sign off are also used to ensure that operational staff are aware of sampling requirements and timeline as per the ECA and Federal requirements.

Effluent quality control and assurances measures were undertaken by the MOE certified laboratory, Caduceon Environmental Laboratories and AGAT Laboratories, which conducts analysis for the Township.

G. Flow Measurement and Equipment Calibration

Summary of the calibration and maintenance carried out on all effluent monitoring equipment

Annual calibration of the flow sensing device (magmeter) at the Maxille Lagoons waws completed in April 2024 and the calibrations on all level detection units (pumping station levels and chemical tank levels), and flow sensing device at the Main Pumping Station (miltronics, etc) was completed by St- Laurent Instrumentation in November 2024.

H. Effluent Objectives

A description of efforts made, and results achieved in meeting the effluent objectives of condition 6

Sampling was completed once for acute lethality and four times throughout the discharge period for $CBOD_5$, TSS and TP, as per the system ECA and the Federal Wastewater System Regulation. The TSS annual average was found to exceed the ECA objectives and the Federal Wastewater System Regulation limits, due to the first sample results being elevated, but all remaining TSS sample results below the provincial objectives. All other sampling parameters results were well below the provincial ECA design objectives, the provincial ECA effluent limits, and the Federal Wastewater System Effluent Regulations limits, including the acute lethality results which indicated the sample was not acutely lethal.

Throughout the discharge per there was no notation of abnormal observances during sampling or an indication the sample had an increased suspended solid appearance. Please refer to the tables below for the summary results. A full discharge summary can be found in Appendix C.

Table 4: Provincial and Federal Effluent Sampling Results

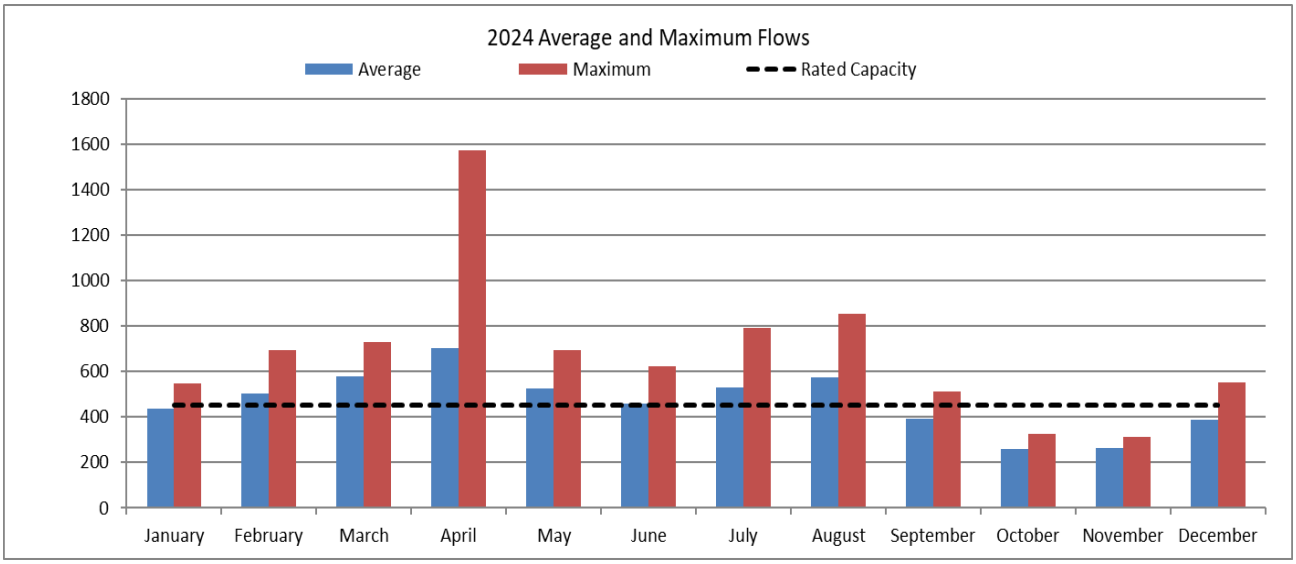
Effluent Parameter	$CBOD_5$	TSS	TP	pH	Acute Lethality
Provincial Effluent Limits (mg/L)	*30*	*30*	*1*	*6.0 - 9.5*	
Federal Effluent Limits (mg/L)	*25*	*25*			*50 %*
08-Mar-2024	10	46	0.60	7.22	
12-Mar-2024	8	20	0.42	7.16	
14-Mar-2024					40
19-Mar-2024	8	21	0.34	7.65	
27-Mar-2024	3	23	0.50	7.11	
2024 Maxville Average Concentration	**7.3**	**27.5**	**0.47**	**7.11-7.65**	**40**

Table 5: Provincial Calculated Waste Loading Results

Effluent Parameter	$CBOD_5$	TSS	TP
Provincial Average Waste Loading Limits (kgs)	4932	4932	164
2024 Maxville Average Waste Loading (kgs)	1184	4491	76

The annual average daily flow for 2024 was calculated to be 468m^3/day, and the maximum daily flow for the year was reported to be 1,572m^3/day. This represents 104% of the total rated capacity, which exceeds the rated capacity of this facility. Please refer to the chart below and to Appendix A for a full summary of flows, for the Maxville Sewage Treatment Works. The flow values displayed below are based on the lagoon influent flows, due to flow discrepancies noted in previous years.

Figure 3: Monthly Average and Maximum Flow Comparison



There were no reports made in regard to floating or settleable solids within the wastewater effluent. There were also no reports made that the effluent wastewater contained oil or any other substance that created a visible film, sheen, foam or discolouration to the receiving waters.

I. Lagoon Cell Sludge Accumulation

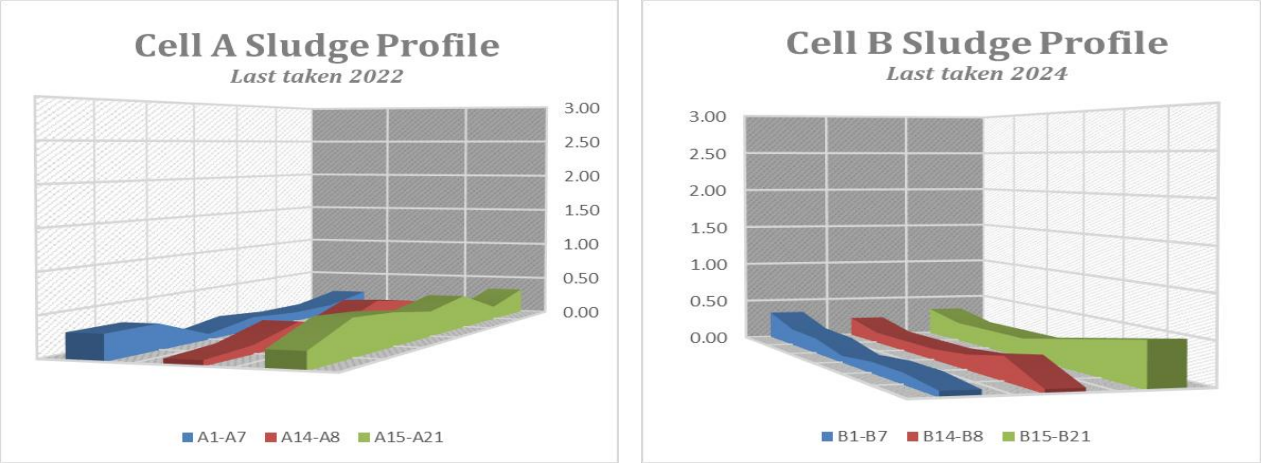
A tabulation of the volume of sludge generated in the reporting period, an outline of anticipated volumes to be generated in the next reporting period and a summary of the locations to where the sludge was disposed

A Sludge Management Plan created by McIntosh Pert and put into place in 2008. As part of the monitoring methods, it is recommended that sludge level should be taken annually.

Sludge levels in Cell A were collected on October 18, 2024 but levels in Cell B were not collected due to excessive vegetation and low sewage level making it impossible to access the cell for measurement. As per the report, no points exceeded the volume/depth elevation as developed through the plan, but a

warning trigger was exceeded at Cell B outfall and as such the sludge should be removed or dispersed as per recommendations. The Township is to determine if any action is required.

Figure 4: Lagoon Cell Sludge Levels



J. Complaints

Summary of any complaints received during the reporting period and any steps taken to address the complaints.

There was one complaint of sewer back up from a commercial user and upon further inspection it was determined to be an issue on owners side, which was corrected through the owner.

K. Bypass, Overflow, Spill or Abnormal Discharge Event

A summary of all bypass, overflow, spill, abnormal discharge events

There were no bypasses, overflows, spills or abnormal discharge events in 2024.

L. Other

Any other information the District Manager requires from time to time

i. Additional Equipment Summary: EOS 2000

The date of installation and removal of the EOS-2000 unit within each unit

The EOS unit was not installed into the lagoon cells during this reporting period. No additional monitoring in regard to operations was completed.

ii. Authorized System Alterations Summary

A summary of all alterations within the reporting period as authorized by the ECA, including all alterations that pose a significant drinking water threat.

As ECA 181-W601 schedule D, section 6.2.2 a real-Time control system was installed at the Manor lift station to replace the existing control panel, that was no longer repairable due to age of equipment and pump compatibility issues. The system installed was installed and commissioned in October 2024 and was integrated the existing SCADA system used by the Waterworks Department.

After the SCADA system was installed a new sewage pump was installed into the we well to replace the secondary pump that was damaged in January 2024 due to compatibility issues with the existing panel. This work was completed as repair to damaged equipment.

iii. Collection System Inspection, Repair and Remediation to Reduce System Overflows

A summary of all works completed within the reporting period as authorized by the ECA, including all projects undertaken, PPCP updates and an assessment of the effectiveness of these actions.

Work to reduce infiltration and inflow was continued through collection system flow monitoring by EVB technicians, which included monthly or bi-monthly sensor inspection and data collection. The sensors are

intermittently moved throughout the collection system to ensure a more comprehensive system overview. More targeted work to reduce inflow and infiltration is intended to be completed in the near future to help reduce the suspected inflow and infiltration into collection system as a part of working towards regaining compliance of the rated capacity at the Maxville Sewage Lagoons.

NORTH GLENGARRY WATER WORKS

WASTEWATER TREATMENT WORKS PERFORMANCE RESULTS

Municipality: North Glengarry
Year: 2024
Project: Maxville WWTP
Receiving Stream: West Branch Scotch River
Description: 1 Pumping Station, 2 Facultative Cells
Seasonal Discharge with Phosphorous Removal
Design Capacity: 450 m^3/day

MONTH	Flows						Biochemical Oxygen Demand				Suspended Solids			
	Total Influent Flow (m^3)	Average Daily Influent Flow (m^3)	Maximum Daily Influent Flow (m^3)	Total Effluent Flow (m^3)	Average Daily Effluent Flow (m^3)	Maximum Daily Effluent Flow (m^3)	Average Raw BOD_5 (mg/L)	Average Effluent $CBOD_5$ (mg/L)	Percent Removal (%)	Average $CBOD_5$ Loading (kgs)	Average Raw TSS (mg/L)	Average Effluent TSS (mg/L)	Percent Removal (%)	Average TSS Loading (kgs)
January	13,486	435	548				115				140			
February	14,606	504	693				24				114			
March	17,976	580	729	163,307	8,595	11,930	68	7.3	89	1,184	280	27.5	90	4,490.9
April	21,150	705	1,572				57				195			
May	16,314	526	694				132				275			
June	13,753	458	622				187				1,000			
July	16,374	528	792				64				480			
August	17,849	576	854				27				360			
September	11,709	390	511				17				115			
October	8,084	261	324				110				460			
November	7,907	264	314				0				0			
December	12,013	388	552				71				440			
Total	171,220			163,307						1,184				4,491
Average	14,268	468		163,307	8,595		73	7	89		322	28	90	
Maximum	21,150		1,572	163,307		11,930	187	7	89		1,000	28	90	
Criteria		***450***						***30***		***4932***		***30***		***4932***

NORTH GLENGARRY WATER WORKS

WASTEWATER TREATMENT WORKS PERFORMANCE RESULTS

2024

MONTH	Phosphorus				Total Kjeldahl Nitrogen			Nitrite			Nitrate		
	Average Raw TP (mg/L)	Average Effluent TP (mg/L)	Percent Removal (%)	Average TP Loading (kgs)	Average Raw TKN (mg/L)	Average Effluent TKN (mg/L)	Percent Removal (%)	Average Raw Nitrite (mg/L)	Average Effluent Nitrite (mg/L)	Percent Removal (%)	Average Raw Nitrate (mg/L)	Average Effluent Nitrate (mg/L)	Percent Removal (%)
January	2.6												
February	2.0												
March	2.1	0.47	78	164									
April	2.1												
May	5.9												
June	11.0												
July	4.5												
August	9.4												
September	0.9												
October	3.6												
November	0.0												
December	4.7												
Total				164									
Average	4.07	0.47	78										
Maximum	11.00	0.47	78										
Criteria	9.70	0.38											

NORTH GLENGARRY WATER WORKS

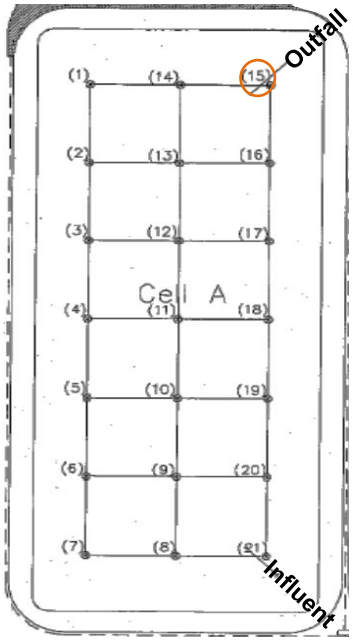
WASTEWATER TREATMENT WORKS PERFORMANCE RESULTS

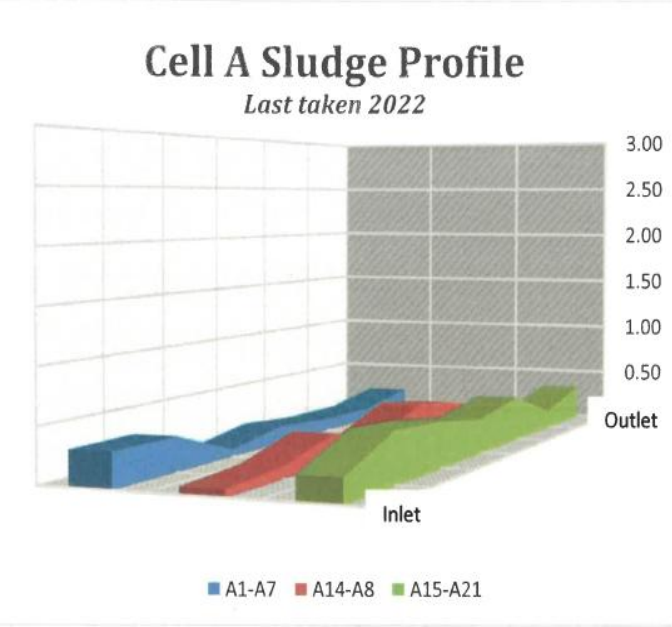
2024

MONTH	Total Dissolved Solids			O-Phosphate			Ammonia			E-Coli		
	Average Raw TDS (mg/L)	Average Effluent TDS (mg/L)	Percent Removal (%)	Average Raw O-Phosphate (mg/L)	Average Effluent O-Phosphate (mg/L)	Percent Removal (%)	Average Raw Ammonia (mg/L)	Average Effluent Ammonia (mg/L)	Percent Removal (%)	Average Raw E.Coli (mg/L)	Average Effluent E.Coli (mg/L)	Percent Removal (%)
January												
February												
March												
April												
May												
June												
July												
August												
September												
October												
November												
December												
Total												
Average												
Maximum												
Criteria												

2024 Annual Cell A Sludge Reports

Maxville Lagoon Cell A-Sample Point Sludge Volume (m^3)																						Total Sludge Volume (m^3)	Total Sludge Volume (%)	Warning Trigger [2]
Date	1	?	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21			
06-Oct-14	521	395	291	271	291	395	427	438	81	446	162	344	284	438	616	437	479	458	333	500	403	8,010	32	
06-Nov-15	379	437	1478	229	541	437	498	369	324	324	527	628	628	600	379	541	749	645	1082	749	379	11,923	47	
07-Nov-16	403	125	458	333	229	562	142	369	324	446	446	446	446	507	24	562	354	458	458	250	261	7,600	30	
29-Oct-19	687	458	458	500	229	500	332	323	527	425	648	547	344	738	569	604	604	604	562	770	853	11,279	45	
28-Oct-20	450	437	437	604	541	437	616	600	911	486	182	527	324	369	24	604	541	541	333	333	877	10,174	40	
11-Nov-22	521	250	250	354	146	666	759	161	223	547	243	648	446	161	759	354	874	666	874	978	521	10,400	41	
19-Oct-23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
18-Oct-24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	



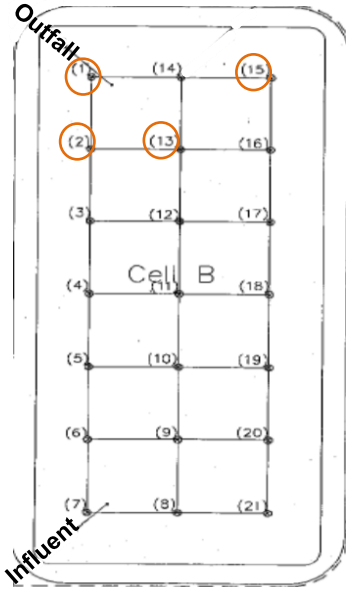


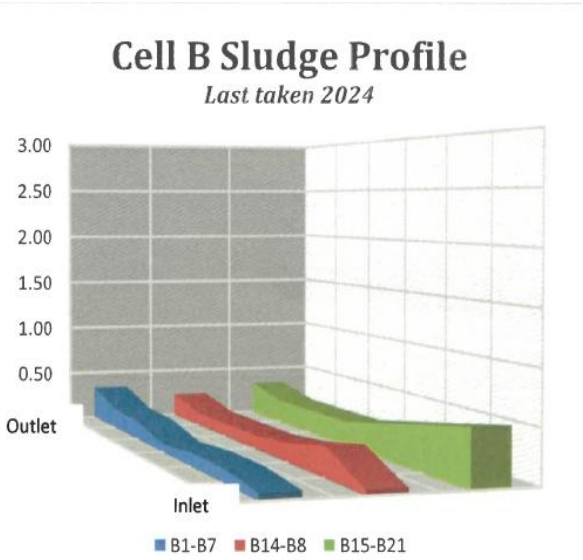
Triggers and Suggested Actions

- Sludge depth completed in November 2022.
- In 2022 Cell A was at 41% of allowable volume, which is a 1% decrease from 2020.
- No single point location exceeded sludge depth triggers in each cell.
- Sludge Depth Warning noted at sample site 15 near the outfall (depth exceeded 0.25m)
  - *Removal or dispersion of sludge may be required.*

2024 Annual Cell B Sludge Reports

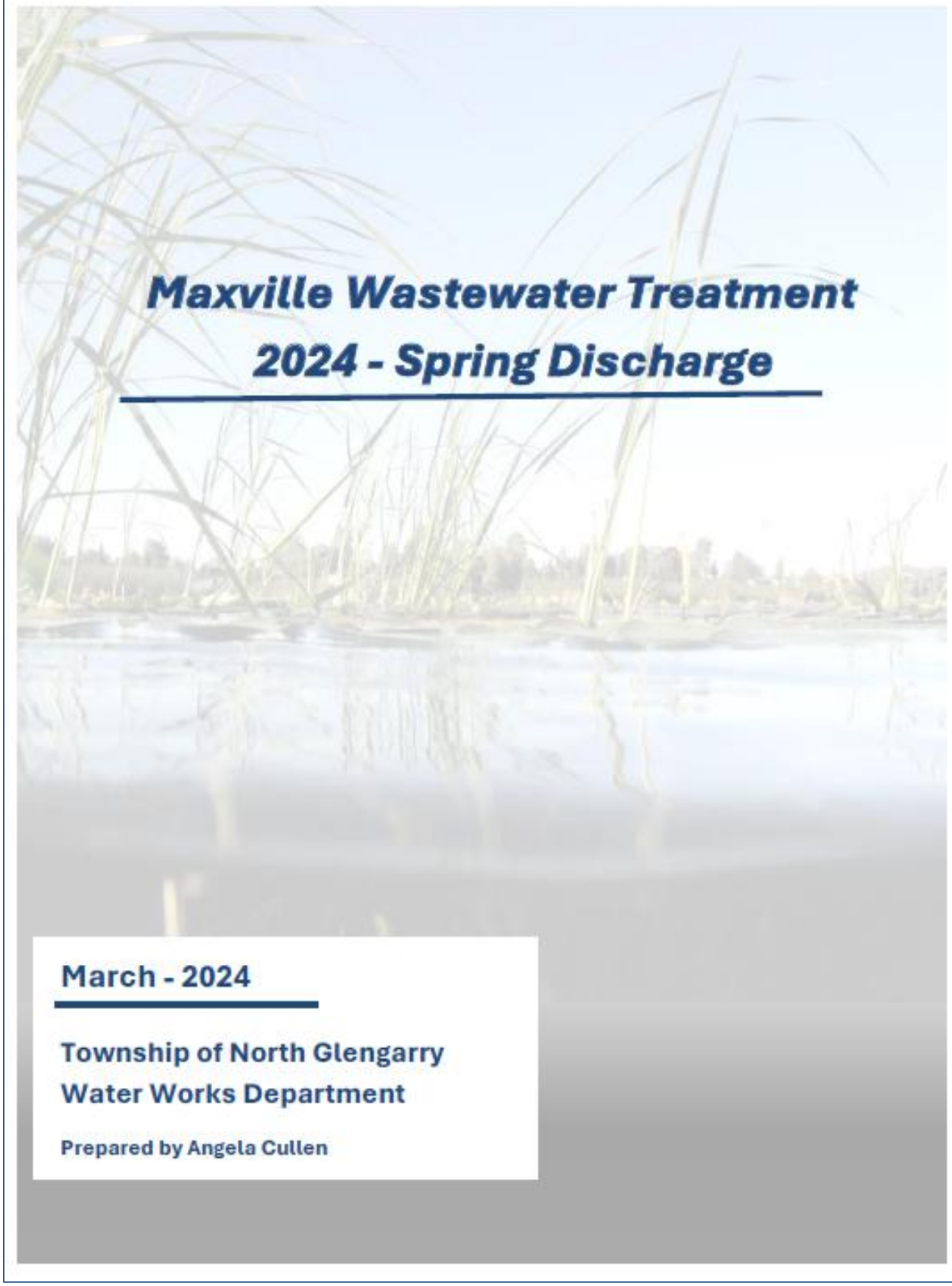
Maxville Lagoon Cell B-Sample Point Sludge Volume (m^3)																						Total Sludge Volume (m^3)	Total Sludge Volume (%)	Warning Trigger [2]
Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21			
06-Oct-14	640	333	666	479	541	395	593	254	263	263	81	101	284	392	403	520	458	187	479	208	593	8,133	32	
06-Nov-15	640	458	333	333	229	229	735	369	225	20	243	344	344	623	640	354	125	354	770	229	261	7,857	31	
07-Nov-16	284	354	354	562	354	562	521	277	243	344	344	547	446	623	166	21	562	562	354	354	877	8,710	35	
29-Oct-19	924	125	333	562	291	395	379	969	648	425	324	446	385	969	616	333	500	562	500	708	379	10,772	43	
28-Oct-20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
14-Nov-22	806	541	645	812	812	624	735	554	628	527	628	527	527	484	782	708	645	770	541	645	972	13,911	55	Total Sludge Volume is Elevated
19-Oct-23	616	895	1166	645	645	645	616	715	324	628	628	425	527	715	735	749	957	749	645	541	853	14,420	57	Total Sludge Volume is Elevated
18-Oct-24	782	416	375	167	271	271	166	115	567	365	263	263	263	530	782	479	479	479	687	895	1256	9,870	39	





Triggers and Suggested Actions

- Sludge depth completed in October 2024
- Currently Cell A is at 39% of allowable volume, which is a 18% decrease from 2023.
- No single point location exceeded sludge depth triggers in each cell.
- Sludge Depth Warning noted at sample site 1,2,13, & 15 near the outfall (depth exceeded 0.25m)
  - ➢ *Removal or dispersion of sludge may be required.*


Maxville Wastewater Treatment
2024 - Spring Discharge
March - 2024
Township of North Glengarry
Water Works Department
Prepared by Angela Cullen

2024 Annual Maxville Spring Discharge Report

Discharge Summary

The annual spring discharge met all requirements of set out in ECA#5368-8PPQA2 under section 9 (Special Operations), as listed below.

- The discharge was targeted to start during Spring peak flows as observed in the West Branch of the Scotch River.
- The annual discharge continuously run over 20 days from Friday, March 8, 2024, until Wednesday, March 27, 2024.
- The discharge effluent flows were maintained to ensure discharge to river mixing ratio was never less than 3.2:1.

Summaries of the annual spring discharge totals and daily flow observations can be found in the tables listed below.

Table 1: Maxville Annual Spring Discharge Summary

Parameter	Total
Total Days Discharged	20
Total Hours Discharged	457.1
Total Amount Discharge to Creek (m^3)	163,307
Average Daily Flow to Discharge (m^3)	8,595

Table 2: Daily Maxville Discharge Flowy Summary

Date	Start Time (from Sting Ray)	Total hours (calculated)	River Flow m^3/s (calculated)	Discharge Rate m^3/s (calculated)	Mixing Ratio (3:1) (calculated)		Discharge Amount m^3 (from Sting Ray)
08-Mar-2024	8:52		0.795	0.125	6.36	:1	
09-Mar-2024	8:56	24.06	0.451	0.115	3.92	:1	9,425.66
10-Mar-2024	8:52	24.93	2.727	0.100	27.27	:1	4,782.77
11-Mar-2024	11:00	26.13	1.107	0.105	10.54	:1	8,908.10
12-Mar-2024	9:14	22.23	0.831	0.135	6.16	:1	8,047.69
13-Mar-2024	8:40	23.43	0.566	0.145	3.90	:1	10,634.20
14-Mar-2024	8:52	24.20	0.466	0.130	3.58	:1	11,929.65
15-Mar-2024	9:11	24.32	0.351	0.105	3.34	:1	11,496.87
16-Mar-2024	8:57	23.77	0.424	0.110	3.85	:1	8,910.39
17-Mar-2024	9:09	24.02	1.220	0.110	11.09	:1	9,294.78
18-Mar-2024	10:01	24.86	0.845	0.150	5.63	:1	9,635.39
19-Mar-2024	9:30	23.48	0.525	0.150	3.50	:1	11,822.67
20-Mar-2024	8:30	23.00	0.245	0.074	3.31	:1	11,622.20
21-Mar-2024	10:54	26.40	0.425	0.130	3.27	:1	7,054.58
22-Mar-2024	8:57	22.05	0.293	0.090	3.26	:1	10,285.05
23-Mar-2024	9:04	24.70	0.207	0.063	3.29	:1	8,288.61
24-Mar-2024	9:44	24.66	0.355	0.105	3.38	:1	5,427.31
25-Mar-2024	8:38	22.90	0.080	0.025	3.20	:1	8,378.84
26-Mar-2024	8:19	23.68	0.216	0.065	3.32	:1	2,437.93
27-Mar-2024	8:34	24.25	0.226				4,924.36

Sampling Summary

All pre-discharge monitoring requirements were met prior to commencement, as listed in Table 4 under condition 10 (Monitoring and Recording),

- 1 set of samples were taken from each cell to be discharged on February 27, 2024, and February 28, 2024.
- $CBOD_5$, TSS and TP results were found to be below the effluent limits.

Table 3: Pre-Discharge Sampling Summary

Parameter	Adverse Samples	# Samples Taken	ECA Parameter Objectives (mg/L)	ECA Parameter Limits (mg/L)	Average Reading (mg/L)	Maximum Reading (mg/L)
$CBOD_5$	N	4	25	30	11	14
T.S.S	N	4	25	30	24	27
T.P.	N	4	0.8	1	0.34	0.41

The discharge was started 9 days after the pre-monitoring sampling. All discharge monitoring requirements were met as listed in Table 5 under condition 10 (Monitoring and Recording).

- Sampling was completed on 4 occasions at 3 separate locations (upstream of discharge, at the discharge outfall and 500m downstream of discharge confluence area).
- All sampling results were well below the provincial objectives and limits, but TSS did exceed the federal limits.
  - The TSS annual average result was below the ECA limit of 30mg/L, but it did exceed the federal limit of 25mg/L.
- Sampling was also completed for acute lethality to meet the requirements for the Federal Wastewater Systems Effluent Regulation. The sample result indicated 40% mortality, meaning the effluent was not acutely lethal to rainbow trout.

Table 4: Discharge Sampling Summary

Parameter	Adverse Samples	# Samples Taken	ECA Parameter Objectives (mg/L)	ECA Parameter Limits (mg/L)	Average Reading (mg/L)	ECA Average Waste Loading Limits (Kgs)	Average Waste Loading (kgs)	Mortality %
Upstream								
$CBOD_5$	n/a	4	n/a	n/a	3.0	n/a	n/a	n/a
TSS	n/a	4	n/a	n/a	15.3	n/a	n/a	n/a
TP	n/a	4	n/a	n/a	0.21	n/a	n/a	n/a
pH	n/a	4	n/a	n/a	7.34 – 7.89*	n/a	n/a	n/a
Discharge								
$CBOD_5$	N	4	25	30	7.3	4932	1183.9	n/a
TSS	N	4	25	30	27.5	4932	4490.9	n/a
TP	N	4	0.8	1	0.47	164	75.94	n/a
pH	N	4	6.0 - 9.5		7.11 - 8.19*	n/a	n/a	
Lethality	N	1	n/a	n/a	n/a	n/a	n/a	40
Downstream								
$CBOD_5$	n/a	4	n/a	n/a	3.0	n/a	n/a	n/a
TSS	n/a	4	n/a	n/a	16.8	n/a	n/a	n/a
TP	n/a	4	n/a	n/a	0.09	n/a	n/a	n/a
pH	n/a	4	n/a	n/a	7.19 – 7.77*	n/a	n/a	n/a

*Minimum and maximum values, not average

Table 5: Daily Discharge Monitoring and Sampling Results Summary

Date	pH	Dissolved Oxygen	Temp.	TSS Sample	TSS Loading	$CBOD_5$ Sample	$CBOD_5$ Loading	TP Sample	TP Loading	Acute Lethality
		mg/L	°C	mg/L	kg	mg/L	kg	mg/L	kg	%
	(grab sample)	(grab sample)	(grab sample)	(grab sample)	(calculated)	(grab sample)	(calculated)	(grab sample)	(calculated)	(grab sample)
8-Mar-24	7.22	7.73	5	46		10		0.60		
9-Mar-24	6.61	4.88	5.8		433.58		94.26		5.66	
10-Mar-24	6.67	3.09	5.2		220.01		47.83		2.87	
11-Mar-24	6.90	6.62	5.8		409.77		89.08		5.34	
12-Mar-24	7.16	7.56	6.1	20	160.95	8	64.38	0.42	3.38	
13-Mar-24	7.27	7.16	8.1		212.68		85.07		4.47	40
14-Mar-24	7.25	7.66	6.3		238.59		95.44		5.01	
15-Mar-24	7.36	6.72	10.3		229.94		91.97		4.83	
16-Mar-24	7.27	6.42	8.5		178.21		71.28		3.74	
17-Mar-24	7.17	7.14	8.4		185.90		74.36		3.90	
18-Mar-24	7.56	7.90	8.0		192.71		77.08		4.05	
19-Mar-24	7.65	9.02	3.4	21	248.28	8	94.58	0.34	4.02	
20-Mar-24	7.89	8.66	6.2		244.07		92.98		3.95	
21-Mar-24	8.42	9.85	4.8		148.15		56.44		2.40	
22-Mar-24	8.61	8.36	5.4		215.99		82.28		3.50	
23-Mar-24	8.58	7.75	3.3		174.06		66.31		2.82	
24-Mar-24	8.57	8.79	6.9		113.97		43.42		1.85	
25-Mar-24	8.66	7.12	4.9		175.96		67.03		2.85	
26-Mar-24	7.17	7.36	5.3		51.20		19.50		0.83	
27-Mar-24	7.11	7.39	7.4	23	113.26	3	14.77	0.5	2.46	
ECA Limit	***6.0-9.5***			***30***	***4932***	***30***	***4932***	***1***	***164***	***50***
# Samples	20	20	20	*4*	*19*	*4*	*19*	*4*	*14*	*1*
Minimum	**6.61**	**3.09**	**3.30**	**20**	**51.2**	**3**	**14.8**	**0.34**	**0.83**	40
Average	**7.56**	**7.36**	**6.26**	**28**	**207.8**	**7**	**70.0**	**0.47**	**3.57**	40
Maximum	**8.66**	**9.85**	**10.30**	46	**433.6**	**10**	**95.4**	**0.60**	**5.66**	40

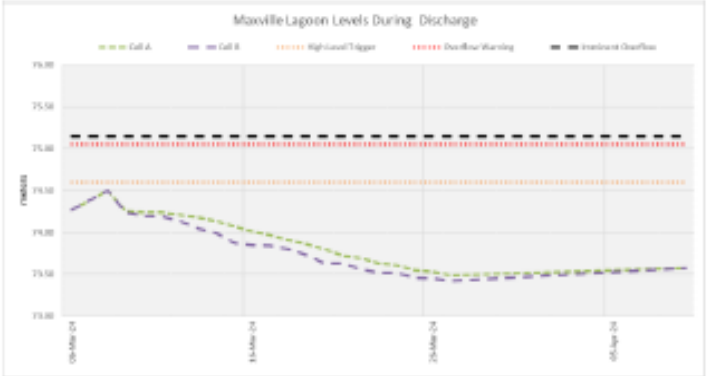
Lagoon Levels

Lagoon cell levels were measured from Cell A and Cell B in March, prior to discharge commencement, and cell levels were monitored daily throughout the discharge period and summarized in Table 6 below. During the discharge it was noted a cell level discrepancy, but levels did equalize.

Table 6: Lagoon Cell Level Summary

Discharge Period		
Parameters	**Cell A**	**Cell B**
	Cell Level (m)	Cell Level (m)
Discharge Start	74.50	74.50
Discharge End	73.49	73.42
Total Difference	1.01	1.08
Average Daily Discharge	-0.04	-0.04

Figure 1: Lagoon Discharge Levels

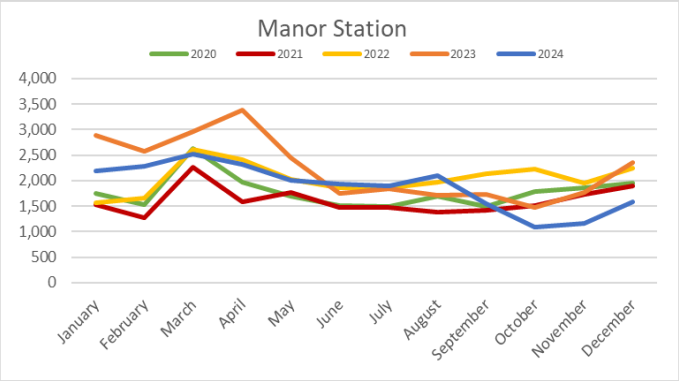


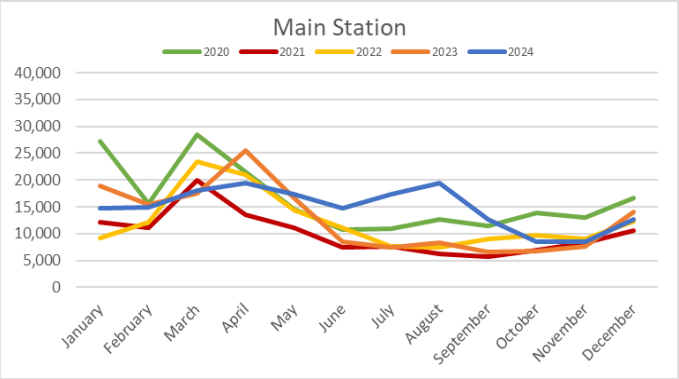
Observed Issues

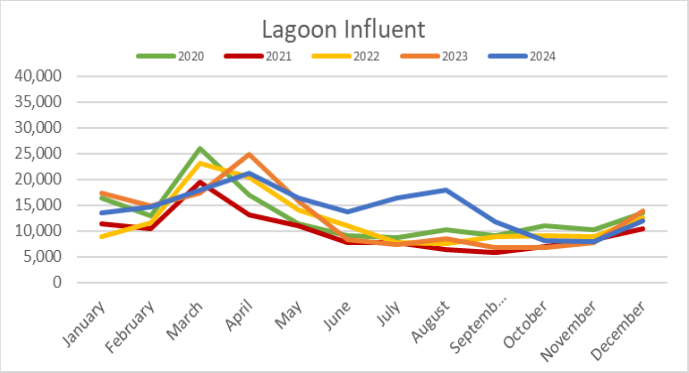
Observed issues noted during this discharge period were minor in nature and include the following:

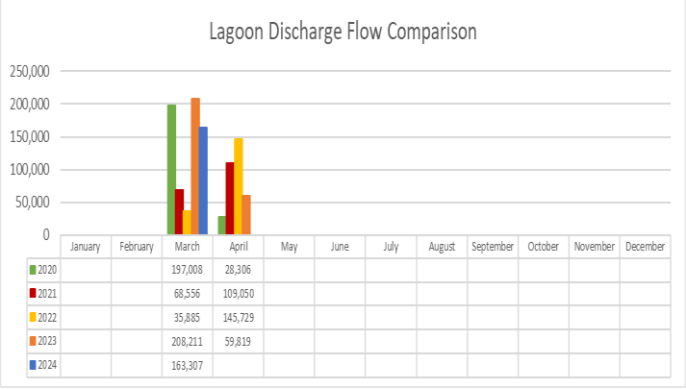
- Minor issues with data collection and flow loss, 1 minute filter was applied to compensate for trending drop-out.
- As per operational staff, foam observed at the beginning of the discharge near the outfall, caused by effluent flow velocity and discharge outfall configuration. It was only noted on two occasions, March 9 and March 11.
  - foam never noted near mixing zone.
- No noted issues in ERIS e-logs.

System Station Flow Comparisons









Manor Station

Month	*2020*	*2021*	*2022*	*2023*	*2024*
January	1,755	1,531	1,562	2,894	2,184
February	1,530	1,272	1,654	2,566	2,287
March	2,633	2,259	2,605	2,952	2,511
April	1,966	1,588	2,401	3,380	2,310
May	1,695	1,766	2,017	2,437	1,999
June	1,501	1,466	1,859	1,750	1,937
July	1,497	1,465	1,863	1,844	1,888
August	1,693	1,375	1,963	1,704	2,094
September	1,500	1,417	2,127	1,724	1,552
October	1,786	1,507	2,233	1,475	1,081
November	1,857	1,733	1,943	1,762	1,154
December	1,955	1,903	2,244	2,360	1,582
Annual	21,367	19,284	24,471	26,850	22,579

Main Station

Month	*2020*	*2021*	*2022*	*2023*	*2024*
January	27,201	12,056	9,161	18,864	14,699
February	15,535	11,010	12,113	15,457	14,965
March	28,496	19,874	23,348	17,430	17,953
April	21,512	13,432	21,067	25,509	19,448
May	14,503	11,144	14,431	16,720	17,324
June	10,729	7,483	11,150	8,514	14,672
July	10,843	7,525	7,560	7,431	17,300
August	12,729	6,291	7,504	8,280	19,504
September	11,457	5,773	8,924	6,559	12,651
October	13,929	6,924	9,673	6,665	8,475
November	12,937	8,289	8,993	7,692	8,433
December	16,586	10,500	12,276	14,105	12,631
Annual	196,457	120,301	146,199	153,227	178,055

Lagoon Influent

Month	*2020*	*2021*	*2022*	*2023*	*2024*
January	16,293	11,389	8,918	17,382	13,486
February	12,904	10,444	11,502	14,799	14,606
March	26,004	19,383	23,010	17,428	17,976
April	17,037	13,113	20,501	24,888	21,150
May	11,349	10,914	14,075	15,863	16,314
June	9,161	7,697	11,090	8,398	13,753
July	8,784	7,663	7,812	7,348	16,374
August	10,186	6,305	7,453	8,410	17,849
September	9,085	5,788	8,872	6,704	11,709
October	10,909	6,987	9,019	6,741	8,084
November	10,252	8,288	8,811	7,687	7,907
December	13,577	10,442	12,552	13,902	12,013
Annual	155,542	118,413	143,615	149,550	171,220

Lagoon Effluent

Month	2020	2021	2022	2023	2024
January					
February					
March	197,008	68,556	35,885	208,211	163,307
April	28,306	109,050	145,729	59,819	
May					
June					
July					
August					
September					
October					
November					
December					
Annual	225,314	177,606	181,614	268,031	163,307