

Township of North Glengarry

Maxville Wastewater System

2023 Annual Report

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1. Performance Assessment

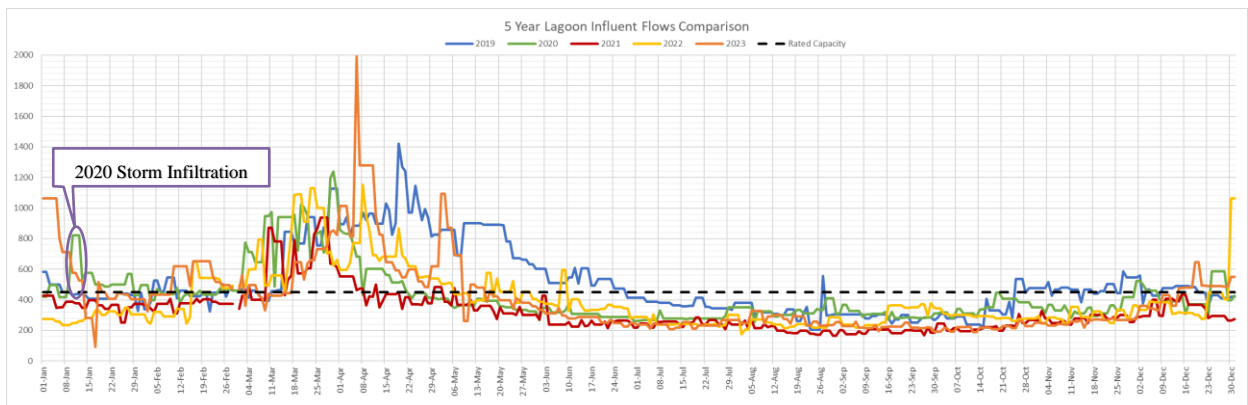
Summary and interpretation of all monitoring data collected in accordance with condition 10 and a comparison to the effluent limits outlined in condition 7, including an overview of the success and adequacy of the works.

The Wastewater System servicing the village of Maxville, Ontario is comprised of a class 2 collection system and a class 1 treatment lagoon system. The collection system is comprised of an interconnected network of sanitary service laterals, sanitary sewage mains, sanitary manholes, sewage force mains and pumping stations used to collect and transport wastewater to the treatment lagoon system. The treatment lagoons consist of a coagulant dosing system, 2 facultative lagoon cells, and chambers for both the influent and effluent flows. The influent wastewater flows are directed into one of the two lagoon cells and are dosed year-round with coagulant to aid in reducing phosphorus levels. The influent flow are rotated between cells each year by operational staff as a part of the maintenance program. The wastewater is treated through natural biological means and only discharged annually, coinciding with the Spring Thaw and peak flows conditions of the West branch of the Scotch River, as per the Environmental Compliance Approval conditions.

The influent wastewater flows entering the lagoon system is metered by a Magmeter, located prior to the Influent Splitter Chamber, and during the 2023 calendar year, 149,550m³ of untreated raw sewage was directed into the Maxville Lagoon system for treatment. There were no additional wastewater sources discharging into the system throughout this calendar year and growth to the system is very limited, however it has been noted the total influent flows have increased slightly since 2022.

Additionally, there were no CCTV inspection programs completed observed during this year, but the engineering firm have been engaged to complete an environmental assessment on the lagoon system due to the elevated rated capacity.

Figure 1: 5yrs Lagoon Influent Flow Comparison

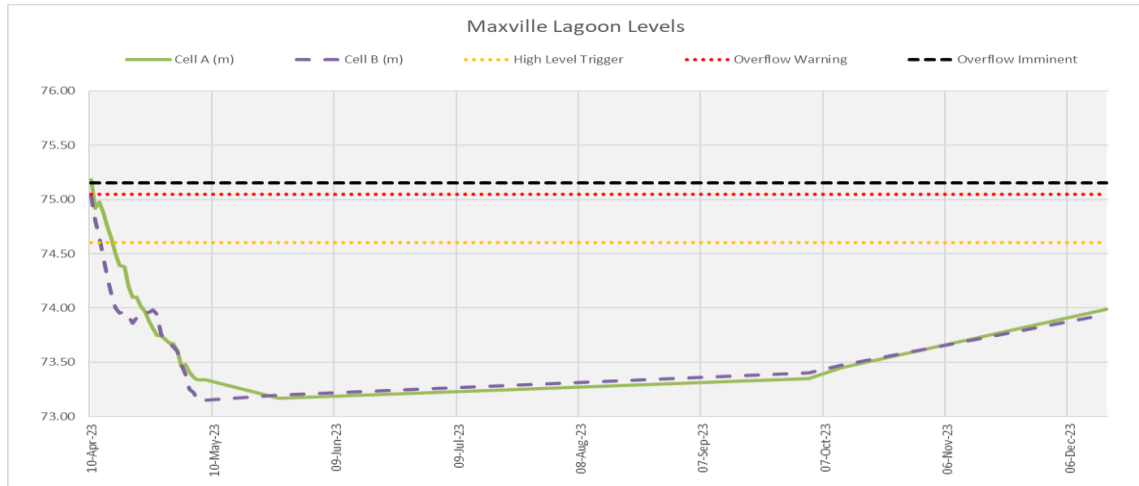


The system operated well throughout 2023, with the raw sewage strength remaining similar to previous years, as per Table 1. The annual discharge began within 14-days of the pre-monitoring sampling, monitoring of the discharge was completed daily by operational staff and sampling was completed on five occasions at 3 sites. The required mixing ratio was always maintained based on the flow monitoring, and pH was always within allowable limits. The final effluent sampling results were well within the limits with the exception of the last TSS sample. Although the annual average for TSS was below the provincial limit of 30mg/L, it did exceed the federal limit of 25mg/L and the provincial average waste loading limit of 4,932kgs. Please see subsections below for a full summary of results and refer to Appendix A for a full summary of all flows, raw influent and treated effluent results.

The lagoon levels in each cell are monitored to ensure the cell capacities are not exceeded and no discharge will occur outside of the allowed discharge period. 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. During the 2023

calendar year the monitoring starting just before the seasonal discharge period, daily throughout the discharge and monthly outside of the discharge period when the cells were not covered by ice. No issues or concerns were noted during this period, and the levels in both cells were found to now be equalized.

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 CBOD₅, Total Suspended Solids (TSS) and Total Phosphorus (TP). All sampling was completed as per conditions listed above; no additional samples were taken during 2023. Although TSS and TP results are slightly increased 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. 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		
	BOD ₅ (mg/L)	TSS (mg/L)	TP (mg/L)
2023	75.5	355.5	5.27
2022	104.6	201.4	4.22
2021	183.1	170.5	4.12
2020	83.9	127	3.92
2019	112.3	222.2	3.32

ii. Pre-Discharge Monitoring

Condition 10(3) of the ECA requires the sampling and analysis of BOD₅, TSS and TP in each lagoon cell within 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 2023 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-Mar-23	5	10	0.32	4	13	0.36
28-Mar-23	4	7	0.17	3	5	0.11

iii. Spring Discharge Monitoring

The 2023 annual spring discharge was a non-stop flow over 29-day period, within a calculated 675.9hrs. The discharge was started on Monday April 10, 2023, and was shut down on Monday May 8, 2023, with a total effluent volume of 268,031m³ 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	Discharge Rate	Mixing Ratio	Discharge Amount
	(from Sting Ray)	(calculated)	(m ³ /s) (calculated)	(m ³ /s) (calculated)	(3:1) (calculated)	(m ³) (from Sting Ray)
10-Apr-23	10:19		1.629	0.213	7.65 : 1	
11-Apr-23	12:34	26.25	1.296	0.205	6.32 : 1	18,860.51
12-Apr-23	9:08	20.56	1.212	0.205	5.91 : 1	14,274.72
13-Apr-23	8:10	23.03	0.895	0.195	4.59 : 1	15,764.96
14-Apr-23	10:27	26.28	0.621	0.195	3.18 : 1	17,405.51
15-Apr-23	8:05	21.63	0.430	0.141	3.05 : 1	14,594.97
16-Apr-23	11:04	26.98	0.409	0.135	3.03 : 1	14,370.35
17-Apr-23	9:02	21.96	0.237	0.075	3.16 : 1	11,367.44
18-Apr-23	8:58	23.93	0.446	0.145	3.08 : 1	6,045.36
19-Apr-23	8:41	23.71	0.166	0.055	3.02 : 1	12,193.99
20-Apr-23	9:19	24.63	0.205	0.067	3.06 : 1	5,151.80
21-Apr-23	8:11	22.86	0.199	0.065	3.06 : 1	5,484.45
22-Apr-23	9:49	25.63	0.212	0.068	3.12 : 1	5,938.29
23-Apr-23	10:23	24.56	0.213	0.068	3.13 : 1	5,789.45
24-Apr-23	12:17	25.90	0.291	0.091	3.20 : 1	6,210.74
25-Apr-23	9:44	23.45	0.382	0.125	3.06 : 1	6,679.69
26-Apr-23	11:22	25.63	0.344	0.111	3.10 : 1	11,206.60
27-Apr-23	8:46	21.40	0.287	0.095	3.02 : 1	8,171.55
28-Apr-23	8:39	23.88	0.207	0.068	3.04 : 1	7,668.18
29-Apr-23	9:32	24.88	0.244	0.076	3.21 : 1	5,805.26
30-Apr-23	10:26	24.90	0.333	0.108	3.08 : 1	6,736.92
01-May-23	8:32	22.10	4.676	0.200	23.38 : 1	8,490.54
02-May-23	8:03	23.48	2.449	0.200	12.25 : 1	16,179.53
03-May-23	8:38	24.58	1.909	0.158	12.08 : 1	16,004.14
04-May-23	8:05	23.45	1.315	0.160	8.22 : 1	13,298.55
05-May-23	8:07	24.03	0.829	0.053	15.64 : 1	8,962.25
06-May-23	9:17	25.16	0.569	0.021	27.10 : 1	2,603.58
07-May-23	11:51	26.56	0.330	0.014	23.57 : 1	1,717.93
08-May-23	12:19	24.46	0.285	0.010	29.72 : 1	1,053.25

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 2023 discharge, samples were collected 5 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. As per the above statement the only issue observed was an elevated TSS result on the last sample. There were no operational issues noted or observed sedimentation during the sampling. Please refer to section 7 and Appendix A for further information.

2. 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 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 (2022 results).

3. Operational Problems

A description of any operating problems encountered and corrected.

Collection System:

- Pump failure at Manor Station
 - multiple refurbishments on a single pump due to on-going failure issues.
 - pump was taken out of service in early 2024 and replacement pump is on-site to be installed once system upgrades are completed.
- Rail System Failure at Manor Station
 - replacement of defective equipment.
- Level float failure
 - replacement of defective equipment.

Treatment System:

- Generator
 - replace defective battery.
 - internal error code inspection and repair.
- Central equalization valve partial blockage
 - external flushing truck utilized to remove blockage from pipe.

4. 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 April and December
- Annual station wet well cleaning completed in August.
- Monthly emergency generator testing, no issues noted.

- Monthly alarm signal testing.
- Monthly pest control monitoring, no issues noted.

Treatment System:

- Annual flow meter calibration in April 2023.
- Monthly pest control monitoring at equipment building, no issues noted.
- Cleaned influent chamber in May 2023.

5. 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.

6. Flow Measurement and Calibration

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

Annual calibration was completed by St- Laurent Instrumentation in December 2023. Calibrations were performed on all level detection units (pumping station levels and chemical tank levels), and flow sensing devices (magmeters, miltronics, etc.).

7. Effluent Objectives

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

Sampling was completed five times throughout the discharge period and the annual average concentrations were all below the provincial ECA effluent limits, however the annual average TSS was found to exceed the provincial objectives, the Federal Wastewater System Effluent Regulations limit, and the provincial annual average waste loading limits. The last results reported for TSS was well above the allowable concentration limits, the exceedances were reported as required. This sample was the last sample taken prior to discharge shut down, there was no notation of abnormal observances during sampling or an indication the sample had an increased suspended solid appearance. An acute lethality sample was taken at the midpoint of the discharge, and the results indicated the sample was not acutely lethal. 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

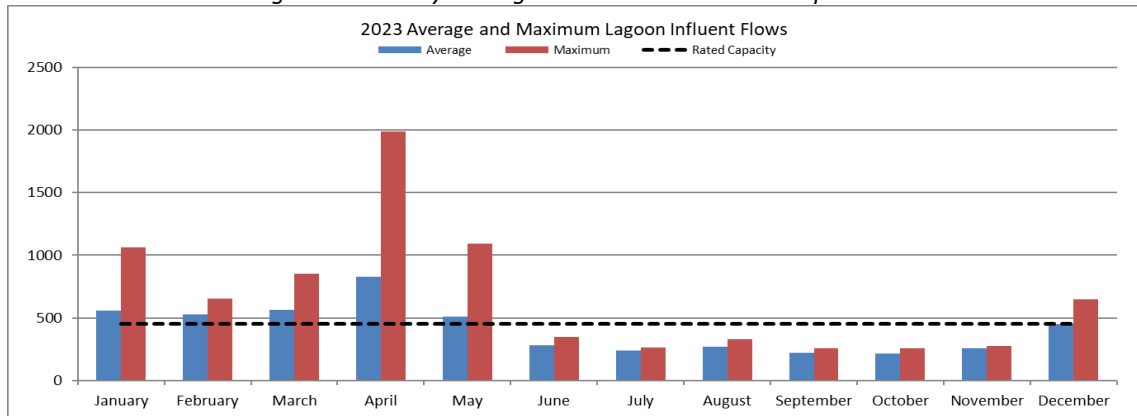
Effluent Parameter	CBOD ₅	TSS	TP	pH	Acute Lethality
<i>Provincial Effluent Limits (mg/L)</i>	<i>30</i>	<i>30</i>	<i>1</i>	<i>6.0 - 9.5</i>	
<i>Federal Effluent Limits (mg/L)</i>	<i>25</i>	<i>25</i>			<i>50 %</i>
10-Apr-2023	3	11	0.35	7.11	
18-Apr-2023	6	14	0.30	7.53	0
20-Apr-2023	28	10	0.34	8.19	
25-Apr-2023	9	16	0.30	7.75	
8-May-2023	3	84	0.54	7.75	
2023 Maxville Average Concentration	9.8	27	0.37	7.02 - 8.26	0

Table 5: Provincial Calculated Waste Loading Results

Effluent Parameter	CBOD ₅	TSS	TP	pH
Provincial Average Waste Loading Limits (kgs)	4932	4932	164	
2023 Maxville Average Waste Loading (kgs)	2626.7	7236.8	98.1	

The annual average daily flow for 2023 was calculated to be 411m³/day, and the maximum daily flow for the year was reported to be 1,990m³/day. This represents 91.2% of the total rated capacity, which is within 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.

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.

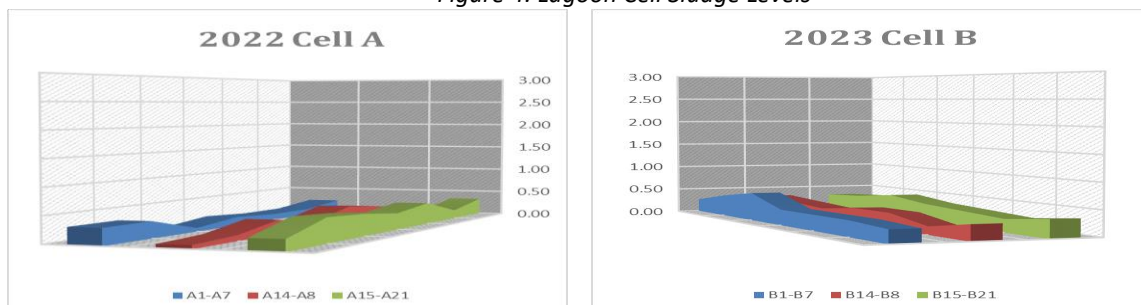
8. Sludge Accumulation

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 was created by McIntosh Perry 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 B were collected on October 19, 2023, but levels in Cell A were not taken due to low water levels. As per the report, no points exceeded the volume/depth elevation as per setpoints developed through the plan but the total sludge volume in Cell B exceeded the trigger warning. It was also noted that warning triggers were also 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



9. Complaints

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

There were no complaints within this reporting period from the wastewater system.

10. Bypass, Overflow, Spill or Abnormal Discharge Event

A summary of all bypasses, overflow, spill, abnormal discharge events.

There were no bypasses, overflows, spills, or abnormal discharge events in 2023.

11. Other

Any other information the District Manager requires from time to time.

There were no additional monitoring or reporting requirements at this time.

NORTH GLENGARRY WATER WORKS

WASTEWATER TREATMENT WORKS PERFORMANCE RESULTS

Municipality: North Glengarry

Year: 2023

Project: Maxville WWTP

Receiving Stream: West Branch Scotch River

Description: 1 Pumping Station, 2 Facultative Cells

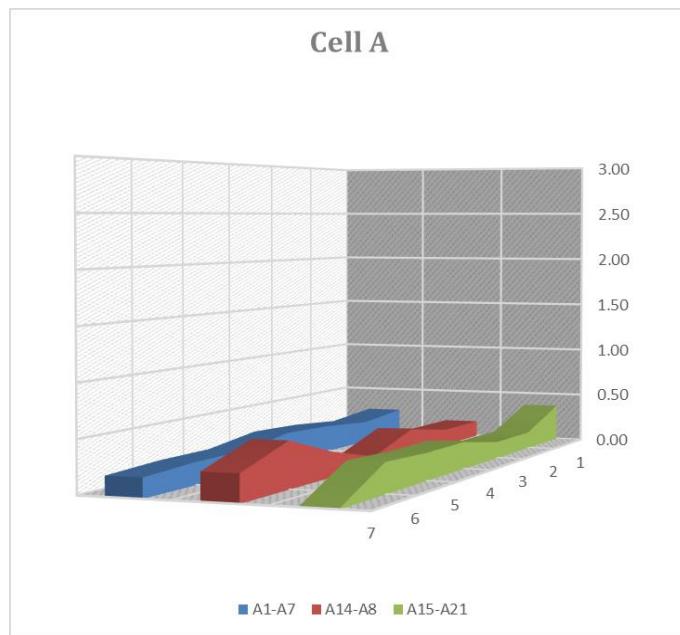
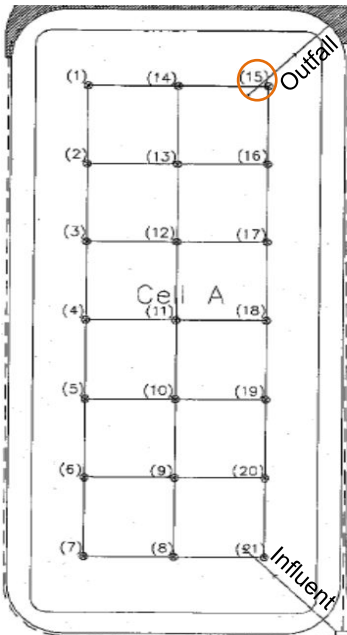
Design Capacity: 450 m³/day

Seasonal Discharge with Phosphorous Removal

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 Waste Loading (kgs)	Average Raw TSS (mg/L)	Average Effluent TSS (mg/L)	Percent Removal (%)	Average TSS Waste Loading (kgs)
January	17,382	561	1,062				84				120			
February	14,799	529	653				77				115			
March	17,428	562	854				45				120			
April	24,888	830	1,990	208,211	9,915	18,861	51	12	77	2,394	190	13	93	2,655
May	15,863	512	1,092	59,819	8,546	16,180	24	3	88	179	310	84	73	5,025
June	8,398	280	348				156				450			
July	7,348	237	266				129				160			
August	8,410	271	328				61				700			
September	6,704	223	257				106				580			
October	6,741	217	260				73				350			
November	7,687	256	278				75				330			
December	13,902	448	646				33				600			
Total	149,550			268,030										
Average	12,462	411		134,015	9,231		76	10		2,627	335	27		7,237
Maximum	24,888		1,990	208,211		18,861	156				700			
Criteria		450						30		4932		30		4932

2022 Annual Cell A Sludge Reports

Maxville	Cell A-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
	12-Nov-08	1754	271	624	458	937	791	545	715	608	608	608	608	608	1038	356	624	624	937	937	624	1446	15,717	62	Total Sludge Volume is Elevated
	22-Apr-09	356	312	312	562	312	146	711	392	203	608	1215	871	810	254	284	728	312	312	937	416	1067	11,119	44	
	27-Apr-10	711	416	583	520	416	271	237	0	101	263	263	304	101	415	237	271	167	416	520	416	711	7,340	29	
	07-Oct-10	237	354	312	208	250	312	284	277	405	243	1337	243	142	2076	356	458	354	312	312	208	284	8,963	36	
	08-Dec-11	0	0	0	0	0	312	237	277	203	142	0	0	0	0	119	146	42	312	354	1186	1114	4,442	18	
	24-Oct-12	119	104	146	0	146	42	166	115	101	41	0	101	203	231	47	42	104	42	42	104	356	2,249	9	
	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	



Triggers and Suggested Actions

- Sludge depth measurements were not completed due to low water levels observed in October
- All results displayed are from 2022.

2023 Annual Outfall Summary

Triggers	Monitoring Point	Warning ¹ - Sludge Depth Exceeds Trigger on	Monitoring Point	Warning ¹ - Sludge Depth Exceeds Trigger on	Monitoring Point	Warning ¹ - Sludge Depth Exceeds Trigger on	Monitoring Point	at the Cell A outfall, Cell B
Cell A	13	<u>12-Nov-08</u>	14	<u>12-Nov-08</u>	15		16	<u>12-Nov-08</u>
	13	<u>22-Apr-09</u>	14		15		16	<u>22-Apr-09</u>
	13		14		15		16	
	13		14	<u>07-Oct-10</u>	15		16	
	13		14		15		16	
	13		14		15		16	
	13		14		15	<u>06-Oct-14</u>	16	
	13	<u>06-Nov-15</u>	14	<u>06-Nov-15</u>	15		16	<u>06-Nov-15</u>
	13		14		15		16	<u>07-Nov-16</u>
	13		14	<u>29-Oct-19</u>	15		16	<u>29-Oct-19</u>
	13		14		15		16	<u>28-Oct-20</u>
	13		14		15	<u>11-Nov-22</u>	16	
	13		14		15		16	
Cell B	1		2		13		14	
	1	<u>22-Apr-09</u>	2		13		14	<u>22-Apr-09</u>
	1		2		13		14	
	1		2		13		14	
	1		2		13	<u>08-Dec-11</u>	14	
	1		2		13		14	
	1	<u>06-Oct-14</u>	2		13		14	
	1	<u>06-Nov-15</u>	2		13		14	<u>06-Nov-15</u>
	1		2		13		14	<u>07-Nov-16</u>
	1	<u>29-Oct-19</u>	2		13		14	<u>29-Oct-19</u>
	1		2		13		14	
	1	<u>14-Nov-22</u>	2	<u>14-Nov-22</u>	13	<u>14-Nov-22</u>	14	
	1	<u>19-Oct-23</u>	2	<u>19-Oct-23</u>	13	<u>19-Oct-23</u>	14	<u>19-Oct-23</u>

Triggers and Suggested Actions

	Note ² : If a sample point is underlined, this signifies that the volume/depth of a sludge in that section of the cell is elevated and action might be required to obtain a uniform sludge distribution
1	Trigger depth of 0.25 m near outlet is exceeded Removal or Dispersal of sludge may be required
2	More than half the <i>Total Sludge Volume</i> (25,170 m ³) noted on the ECA is estimated in each cell Depending on location of elevated sludge depths, removal or dispersal of sludge may be required
3	The trigger sludge depths (see <i>Sample Points Area</i> sheet) is exceeded in this cell At an individual locations, the sludge depth in more than 1/3 of the working depth in the cell (1.8 m); sludge removal or dispersal may be required



***Maxville
Spring
Discharge
2023***

May 2023

**Township of North Glengarry
Water Works Department**
Prepared by Angela Cullen

Maxville Spring Discharge 2023 Annual 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 was continuously run over 29 days from Monday April 10, 2023 until Monday May 8, 2023.
- The discharge effluent flows were maintained to ensure discharge to river mixing ratio was never less than 3.02:1.

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

Parameter	Total
Total Days Discharged	29
Total Hours Discharged	675.9
Total Amount Discharge to Creek (m ³)	268,031
Average Daily Flow to Discharge (m ³)	9,573

Date	Start Time	Total hours	River Flow	Discharge Rate	Mixing Ratio	Discharge Amount
	(from Sting Ray)	(calculated)	m ³ /s (calculated)	m ³ /s (calculated)	(3:1) (calculated)	m ³ (from Sting Ray)
10-Apr-23	10:19		1.629	0.213	7.65 : 1	
11-Apr-23	12:34	26.25	1.296	0.205	6.32 : 1	18,860.51*
12-Apr-23	9:08	20.56	1.212	0.205	5.91 : 1	14,274.72
13-Apr-23	8:10	23.03	0.895	0.195	4.59 : 1	15,764.96*
14-Apr-23	10:27	26.28	0.621	0.195	3.18 : 1	17,405.51*
15-Apr-23	8:05	21.63	0.430	0.141	3.05 : 1	14,594.97*
16-Apr-23	11:04	26.98	0.409	0.135	3.03 : 1	14,370.35
17-Apr-23	9:02	21.96	0.237	0.075	3.16 : 1	11,367.44
18-Apr-23	8:58	23.93	0.446	0.145	3.08 : 1	6,045.36**
19-Apr-23	8:41	23.71	0.166	0.055	3.02 : 1	12,193.99
20-Apr-23	9:19	24.63	0.205	0.067	3.06 : 1	5,151.80
21-Apr-23	8:11	22.86	0.199	0.065	3.06 : 1	5,484.45
22-Apr-23	9:49	25.63	0.212	0.068	3.12 : 1	5,938.29
23-Apr-23	10:23	24.56	0.213	0.068	3.13 : 1	5,789.45**
24-Apr-23	12:17	25.90	0.291	0.091	3.20 : 1	6,210.74
25-Apr-23	9:44	23.45	0.382	0.125	3.06 : 1	6,679.69
26-Apr-23	11:22	25.63	0.344	0.111	3.10 : 1	11,206.60
27-Apr-23	8:46	21.40	0.287	0.095	3.02 : 1	8,171.55
28-Apr-23	8:39	23.88	0.207	0.068	3.04 : 1	7,668.18**

Date	Start Time	Total hours	River Flow	Discharge Rate	Mixing Ratio	Discharge Amount
	(from Sting Ray)	(calculated)	m ³ /s (calculated)	m ³ /s (calculated)	(3:1) (calculated)	m ³ (from Sting Ray)
29-Apr-23	9:32	24.88	0.244	0.076	3.21 : 1	5,805.26
30-Apr-23	10:26	24.90	0.333	0.108	3.08 : 1	6,736.92
01-May-23	8:32	22.10	4.676	0.200	23.38 : 1	8,490.54
02-May-23	8:03	23.48	2.449	0.200	12.25 : 1	16,179.53*
03-May-23	8:38	24.58	1.909	0.158	12.08 : 1	16,004.14*
04-May-23	8:05	23.45	1.315	0.160	8.22 : 1	13,298.55
05-May-23	8:07	24.03	0.829	0.053	15.64 : 1	8,962.25
06-May-23	9:17	25.16	0.569	0.021	27.10 : 1	2,603.58
07-May-23	11:51	26.56	0.330	0.014	23.57 : 1	1,717.93
08-May-23	12:19	24.46	0.285	0.010	29.72 : 1	1,053.25

*Note1: on a 1-minute filter was used to calculate daily total due to flow discrepancies in data log
 **Note2: flows were adjusted due to minor battery issues.

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 on March 27, 2023, and March 28, 2023.
- CBOD₅, TSS and TP results were found to be well below the effluent objectives and limits.

The discharge was started 14 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 5 occasions at 3 separate locations (upstream of discharge, at the discharge outfall and 500m downstream of discharge confluence area).
- All sampling results, with the exception of the TSS were well below the objectives and limits.
 - The TSS annual average result was below the ECA limit, however the annual waste loading result was found to have exceeded the ECA limit. This was caused by a single sample result, which was 2.8 times higher than the ECA limit, causing an increased annual average.
- Sampling was also completed for acute lethality to meet the requirements for the Federal Wastewater Systems Effluent Regulation. The sample result indicated 0% mortality, meaning the effluent was not acutely lethal to rainbow trout.

Parameter	# Samples Taken	ECA Parameter Limits (mg/L)	Average Reading (mg/L)	ECA Average Waste Loading Limits (Kgs)	Average Waste Loading (kgs)	Result Adverse	Mortality %
Discharge Outfall							
CBOD ₅	5	30	9.8	4932	2626.7	N	
T.S.S	5	30	27.0	4932	7236.8	Y	
T.P.	5	1	0.37	164	98.1	N	
pH	29		7.11 - 8.19*				
Acute Lethality	1						0
Upstream							
CBOD ₅	5		3.2				
T.S.S	5		10.6				
T.P.	5		0.15				
pH	5		6.95 - 8.18*				

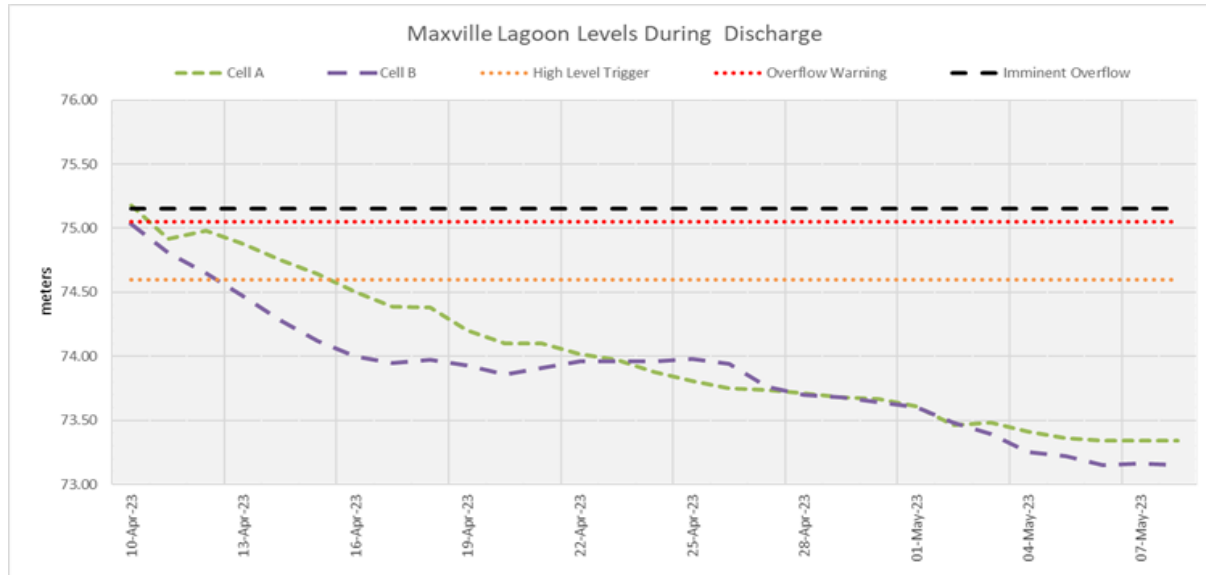
Parameter	# Samples Taken	ECA Parameter Limits (mg/L)	Average Reading (mg/L)	ECA Average Waste Loading Limits (Kgs)	Average Waste Loading (kgs)	Result Adverse	Mortality %
Downstream							
CBOD ₅	5		3.2				
T.S.S	5		9.4				
T.P.	5		0.12				
pH	5		6.91 - 8.84*				

Date	Discharge pH	Discharge Dissolved Oxygen mg/L	Discharge Temperature °C	Discharge TSS Sample mg/L	Discharge TSS Loading kg	Discharge CBOD ₅ Sample mg/L	Discharge CBOD ₅ Loading kg	Discharge TP Sample mg/L	Discharge TP Loading kg	Discharge Acute Lethality %
	(grab sample)	(grab sample)	(grab sample)	(grab sample)	(calculated)	(grab sample)	(calculated)	(grab sample)	(calculated)	(grab sample)
10-Apr-23	7.11	3.00	5.5	11		3		0.35		
11-Apr-23	7.02	4.83	12.2		207.47		56.58		6.60	
12-Apr-23	7.23	4.17	8.2		157.02		42.82		5.00	
13-Apr-23	7.44	2.45	7.2		173.41		47.29		5.52	
14-Apr-23	7.14	2.72	11.3		191.46		52.22		6.09	
15-Apr-23	7.17	5.16	12.0		160.54		43.78		5.11	
16-Apr-23	7.14	4.47	12.4		158.07		43.11		5.03	
17-Apr-23	7.37	3.41	15.1		125.04		34.10		3.98	
18-Apr-23	7.53	4.90	8.8	14	84.64	6	36.27	0.3	1.81	0
19-Apr-23	7.43	4.67	8.9		170.72		73.16		3.66	
20-Apr-23	8.19	6.30	9.3	10	51.52	28	144.25	0.34	1.75	
21-Apr-23	7.39	4.25	9.7		54.84		153.56		1.86	
22-Apr-23	8.24	6.48	12.3		59.38		166.27		2.02	
23-Apr-23	8.06	8.14	13.3		57.89		162.10		1.97	
24-Apr-23	8.22	9.69	12.0		62.11		173.90		2.11	
25-Apr-23	7.75	11.91	11.3	16	106.88	9	60.12	0.3	2.00	
26-Apr-23	8.12	9.54	11.4		179.31		100.86		3.36	
27-Apr-23	8.26	9.83	10.4		130.74		73.54		2.45	
28-Apr-23	7.53	8.75	11.6		122.69		69.01		2.30	
29-Apr-23	8.17	8.44	14.3		92.88		52.25		1.74	
30-Apr-23	7.97	8.95	12.0		107.79		60.63		2.02	
01-May-23	7.84	8.48	10.7		135.85		76.41		2.55	
02-May-23	7.78	9.19	9.7		258.87		145.62		4.85	
03-May-23	7.94	8.29	11.3		256.07		144.04		4.80	
04-May-23	7.68	7.70	10.2		212.78		119.69		3.99	
05-May-23	7.68	7.47	11.6		143.40		80.66		2.69	
06-May-23	7.65	7.76	17.1		41.66		23.43		0.78	
07-May-23	7.93	8.87	21.7		27.49		15.46		0.52	
08-May-23	7.75	8.95	12.4	84	88.47	3	3.16	0.54	0.57	
ECA Limit	6.0-9.5			30	4932	30	4932	1	164	50
# Samples	17	17	17	6	16	6	16	6	16	1
Minimum	7.02	2.45	5.5	10	27.5	3	3.2	0.30	0.52	0
Average		6.85	11.5	27	129.3	10	80.5	0.37	3.11	0
Maximum	8.26	11.91	21.7	84	258.9	28	173.9	0.54	6.60	0

Lagoon Levels

Lagoon cell levels were measured from Cell A and Cell B in April, prior to discharge commencement and a discrepancy between the cell heights were noted, in which Cell A was 0.15m higher than Cell B. This is consistent with previous finding back to late August 2022. The cell levels were monitored daily throughout the discharge period and summarized in Table below.

Discharge Period		
Parameter	Cell A	Cell B
Discharge Start	75.18	75.03
Discharge End	73.34	73.86
Total Difference	1.84	1.17
Average Daily Discharge	-0.07	-0.07

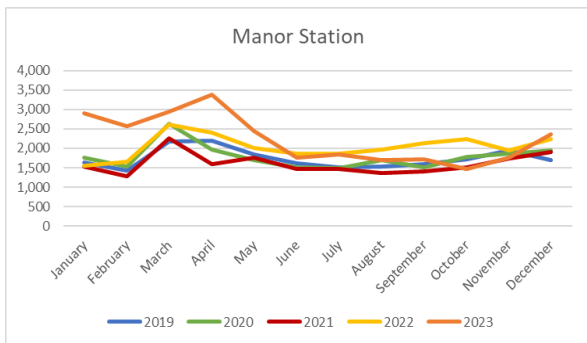


Issues

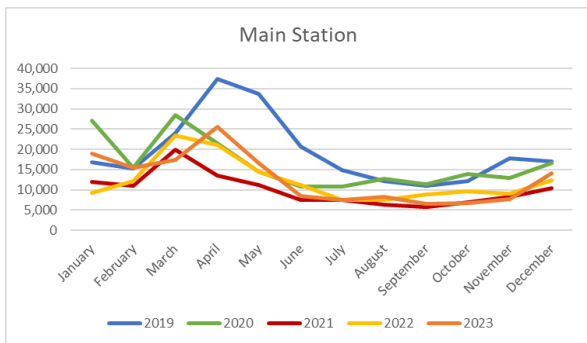
Observed issues noted during this discharge period were minor in nature and include the following:

- Minor battery issues, causing loss of trending for short periods of time, based on flow logs periods were estimated.
- Minor issues with data collection and flow loss, 1 minute filter was applied to compensate for trending drop-out.
- As per operational staff, foam intermittently observed at discharge outfall, caused by effluent flow velocity and discharge outfall configuration. Once flows were below 100L/s foaming was no longer observed.
 - foam never noted near mixing zone.
- No noted issues in ERIS e-logs.
- 2 days after the discharge was completed, the interconnecting piping was flushed to remove any blockage and debris so cell levels can equalize, as previously observed.

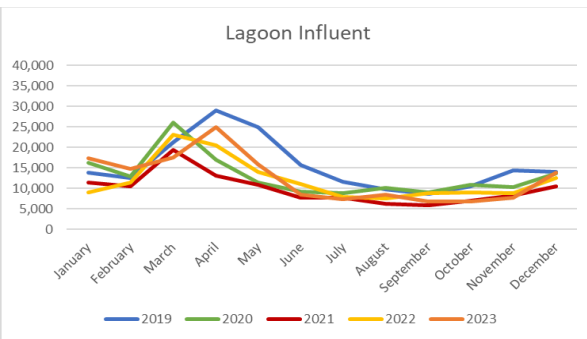
System Station Flow Comparisons



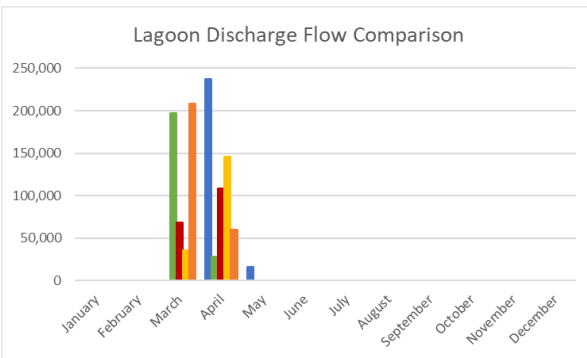
Manor Station					
Month	2019	2020	2021	2022	2023
January	1,636	1,755	1,531	1,562	2,894
February	1,417	1,530	1,272	1,654	2,566
March	2,181	2,633	2,259	2,605	2,952
April	2,201	1,966	1,588	2,401	3,380
May	1,843	1,695	1,766	2,017	2,437
June	1,617	1,501	1,466	1,859	1,750
July	1,507	1,497	1,465	1,863	1,844
August	1,535	1,693	1,375	1,963	1,704
September	1,590	1,500	1,417	2,127	1,724
October	1,712	1,786	1,507	2,233	1,475
November	1,937	1,857	1,733	1,943	1,762
December	1,690	1,955	1,903	2,244	2,360
Annual	20,866	21,367	19,284	24,471	26,850



Main Station					
Month	2019	2020	2021	2022	2023
January	16,875	27,201	12,056	9,161	18,864
February	15,266	15,535	11,010	12,113	15,457
March	23,932	28,496	19,874	23,348	17,430
April	37,403	21,512	13,432	21,067	25,509
May	33,625	14,503	11,144	14,431	16,720
June	20,617	10,729	7,483	11,150	8,514
July	14,803	10,843	7,525	7,560	7,431
August	12,063	12,729	6,291	7,504	8,280
September	10,919	11,457	5,773	8,924	6,559
October	12,079	13,929	6,924	9,673	6,665
November	17,706	12,937	8,289	8,993	7,692
December	16,922	16,586	10,500	12,276	14,105
Annual	232,210	196,457	120,301	146,199	153,227



Lagoon Influent					
Month	2019	2020	2021	2022	2023
January	13,737	16,293	11,389	8,918	17,382
February	12,586	12,904	10,444	11,502	14,799
March	21,265	26,004	19,383	23,010	17,428
April	28,994	17,037	13,113	20,501	24,888
May	24,903	11,349	10,914	14,075	15,863
June	15,693	9,161	7,697	11,090	8,398
July	11,550	8,784	7,663	7,812	7,348
August	9,772	10,186	6,305	7,453	8,410
September	8,600	9,085	5,788	8,872	6,704
October	10,483	10,909	6,987	9,019	6,741
November	14,329	10,252	8,288	8,811	7,687
December	14,069	13,577	10,442	12,552	13,902
Annual	185,980	155,542	118,413	143,615	149,550



Lagoon Effluent					
Month	2019	2020	2021	2022	2023
January					
February					
March		197,008	68,556	35,885	208,211
April	237,322	28,306	109,050	145,729	59,819
May	15,872				
June					
July					
August					
September					
October					
November					
December					
Annual	253,194	225,314	177,606	181,614	268,031