THE CORPORATION OF THE TOWN OF

GANANOQUE

Canadian Gateway to the 1000 Islands

2022 Annual Wastewater Performance Report

Manager of Public Works, David Armstrong
Superintendent of Water and Wastewater Utilities, Don Richards

January 20, 2023

EXECUTIVE SUMMARY

The Corporation of the Town of Gananoque's Public Utilities Division is pleased to provide the 2022 Annual Wastewater Performance Report. The purpose of this report is to keep the public and Council informed regarding the quality of the Town's Wastewater Treatment and Collection System.

The employees of the Town of Gananoque are committed to and share in the responsibilities for implementing, maintaining, and contributing to the continual improvement of the wastewater system.

This Annual Wastewater Performance Report is prepared in accordance with the Certificate of Approval # 0999-7X8QL3. Included with this report is the analytical data, plant flows, process flow schematic and the overall performance of parameter removals.

David Armstrong
Manager of Public Works

Don Richards
Superintendent of Water and Wastewater Utilities

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LIST OF ACRONYMS & DEFINITIONS

Annual Average Concentration	The arithmetic mean of all daily or weekly concentrations, of a contaminant measured during a calendar year.
Annual Average Loading	The value obtained by multiplying the *Annual Average Concentration* of a contaminant by the *Average Daily Flow*.
Average Daily Flow	The cumulative total sewage flow to the sewage works during a calendar year, divided by the number of days during which sewage was flowing to the sewage works that year.
C of A	Certificate of Approval
CFU	Colony Forming Units
L/s	litres per second
m3/d	cubic meters per day
mg/L	milligrams per litre
mL	Milliliter
ML/d	Mega (million) litres per day
MECP	Ministry of the Environment, Conservation and Parks (Ontario)
MOH	Medical Officer of Health
Monthly Average Concentration	The arithmetic mean of all daily or weekly concentrations of a contaminant by the *Average Daily Flow* over the calendar month.
Monthly Average Loading	The value obtained by multiplying the *Monthly Average Concentration* of a contaminate by the *Average Daily Flow.*
O. Reg.	Ontario Regulation

1. Introduction

The following 2022 Annual Wastewater Performance Report is submitted in accordance with Condition 8(4) (a) through (i) of the Certificate of Approval (CofA) # 0999-7X8QL3 for the Gananoque Sewage Lagoons. This report has been prepared by the Town of Gananoque's Public Utilities Staff.

2. Facility Description

The Gananoque Sewage Lagoons have been in operation for more than 50 years. The facility is located north of Highway 401, occupying approximately a 1.5 sq. km (150 ha) parcel of land consisting of 3 Cells.

Raw sewage is received in Cell 1 from the East End Pumping Station (EEPS) through a 400mm diameter forcemain. At the EEPS, alum is added to assist in the reduction of phosphorus and total suspended solids. Once the sewage enters the first cell it flows from one cell to the next allowing the settling of solids and reduction of dissolved nutrients. The final effluent of the Lagoon then discharges to the St Lawrence River.

Refer to "**Appendix A"** to review the systematic drawing.

3. Monitoring Raw Influent and Treated Effluent Data

The Lagoon operated well during 2022 meeting all the regulatory parameters.

Refer to **"Appendix B"** to review the Summary Performance Report.

3.1 Influent and Effluent Lab Results, Limits and Objectives

Table 1: Raw Influent Results

Raw Influent Parameter	Annual Average Concentration in mg/l	Annual Average Loading kg/Day
$CBOD_5$	116.52	373.11
Total Suspended Solids	173.44	565.52
Total Phosphorous	4.54	19.18

Table 2: Effluent CBOD5 and Total Suspended Solids

The *Annual Average Concentrations* and *Annual Average Loading of* $CBOD_5$ and Total Suspended Solids shall not exceed the corresponding average and loading concentrations in the below table.

Effluent Parameter	Annual Average Concentration in mg/l	CofA Concentration Objective in mg/l	CofA Concentration Limit in mg/l	Annual Average Loading in kg/day	CofA Loading Objective in kg/day	CofA Loading Limit in kg/day
$CBOD_5$	6.37	25.0	30.0	25.11	133	159
Total Suspended Solids	11.10	25.0	30.0	42.27	133	159

Table 3: Effluent Total Phosphorous

The *Monthly Average Concentration* and *Monthly Average Loading* of Total Phosphorous shall not exceed the corresponding average and loading concentrations in the below table.

Effluent Parameter	Monthly Average Concentration in mg/l	CofA Concentration Objective in mg/l	CofA Concentration Limit in mg/l	Annual Average Loading in kg/day	CofA Loading Objective in kg/day	CofA Loading Limit in kg/day
Total Phosphorous	0.29	1.0	1.0	1.05	5.30	5.30

Table 4: Effluent pH

The effluent pH must be maintained within the range of 5.5 to 9.5 at all times.

Effluent Parameter	**Annual Minimum**	**CofA Minimum Objective**	**CofA Minimum Limit**	**Annual Maximum**	**CofA Maximum Objective**	**CofA Maximum Limit**
pH	7.7	6.0	5.5	9.0	9.0	9.5

Table 5: Effluent E. Coli

The E.Coli *Annual Average Geometric Mean Density* shall stay below 200 organisms/100ml. Geometric Mean Density is the nth root of the product of multiplication of the results of n number of samples over the year.

Effluent Parameter	Annual Average (Geometric Mean Density) Count organisms/100ml	**Annual Average Geometric Mean Density Objective Count organisms/100ml**
E. Coli	35.63	200

3.2 Flow Data

The annual average daily treated effluent flow for 2022 was 3,720 m3 and the annual average daily raw influent flow was 3,356m3. Weather conditions account for variations in flow differentials throughout the year. The table below provides the average monthly raw influent and treated effluent flow.

Table 6: Average Monthly Flows

Month	**Raw Influent**	**Treated Effluent**
January	2,406	3,310
February	3,685	3,959
March	5,123	5,827
April	4,777	6,250
May	3,455	4,343
June	3,227	3,471
July	2,520	1,760
August	2,337	2,012
September	2,894	2,632
October	2,839	3,609
November	3,102	3,319
December	3,963	4,199

3.3 Bypasses and Overflows

There were 5 bypasses /overflow events during 2022. All events were reported to the Spills Action Centre and Ministry of Health. Through further discussion with the MECP Inspector in September 2022, bypassing from Cell 1 to Cell 2 at the Lagoon is no longer considered a bypass event. Since earlier in the year they were reported as bypasses, they have been recorded as bypasses for the purpose of this report.

Table 7: 2022 Bypass and Overflow Events

Date	Location	Event	Volume	Duration
17-February-2022	Lagoon	Bypass	94.44 m3	13 Hours 17 Minutes
17-February-2022	East End Pumping Station	Overflow	182 m3	1 Hour
06-March-2022	Lagoon	Bypass	630 m3	5 Hours 15 Minutes
24-June-2022	Lagoon	Bypass	29,331 m3	24-June-2022 to 5-July-2022
27-September-2022	Lagoon	Bypass	81 m3	45 Minutes

4.0 Operating Challenges and Corrective Action

The Town of Gananoque completed a Lagoon de-sludging project in 2020 which consisted of the removal of a large quantity of biosolids and vegetation from Cell 1, storing the waste in Geotubes.

On August 2nd 2022 a request was made to the Ministry seeking consent to extend the operating period of the Geotube units onsite at the Lagoon because the original disposal location would no longer accept the biosolids. The Ministry approved the biosolids to stay onsite for one (1) additional freeze-thaw cycle ending on September 15th, 2023.

4.1 Maintenance on Major Structures and Equipment

All works are subject to the annual budget process and approval by Council. A 10 Year Capital Equipment Replacement Plan has been developed which includes an extensive breakdown of all capital equipment that requires allocated funds for refurbishment or replacement.

Refer to **"Appendix C"** to review the 2022 capital project highlights.

4.2 Effluent Quality Assurances/ Control Measure

The Corporation of the Town of Gananoque is committed to comply with all applicable legislation and regulatory requirements as it pertains to wastewater effluent quality, environmental protection, and customer satisfaction.

Gananoque continues to achieve these goals through the implementation of a Quality Management System consisting of policies, procedures, and forms. These documents demonstrate risk-based treatment process evaluation, Operating Authority competency, open communications, appropriate contingency/incident response measures and response to consumers' concerns in a timely manner.

The employees involved within the Wastewater System share responsibilities of implementing, maintaining and contributing to the continual improvement of the Wastewater QMS.

Refer to **"Appendix D"** to review the Ministry of the Environment, Conservation and Parks Assessment Report.

5.0 Calibrations/Maintenance of Effluent Monitoring Equipment

The influent, effluent and pump station flow meters are calibrated annually for accuracy to within plus or minus 10 percent (+/- 10%) of actual flowrate. The last annual calibration was completed on September 12th, 2022.

6.0 Key Contacts

David Armstrong
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Don Richards
Superintendent of Water and Wastewater Utilities
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Email: utilitysuperintendent@gananoque.ca

Christine Brennan
Utilities Compliance Coordinator
Phone: 613-382-2149 ext. 1612
Email: utilitycompliance@gananoque.ca

Appendix A

CELL 2

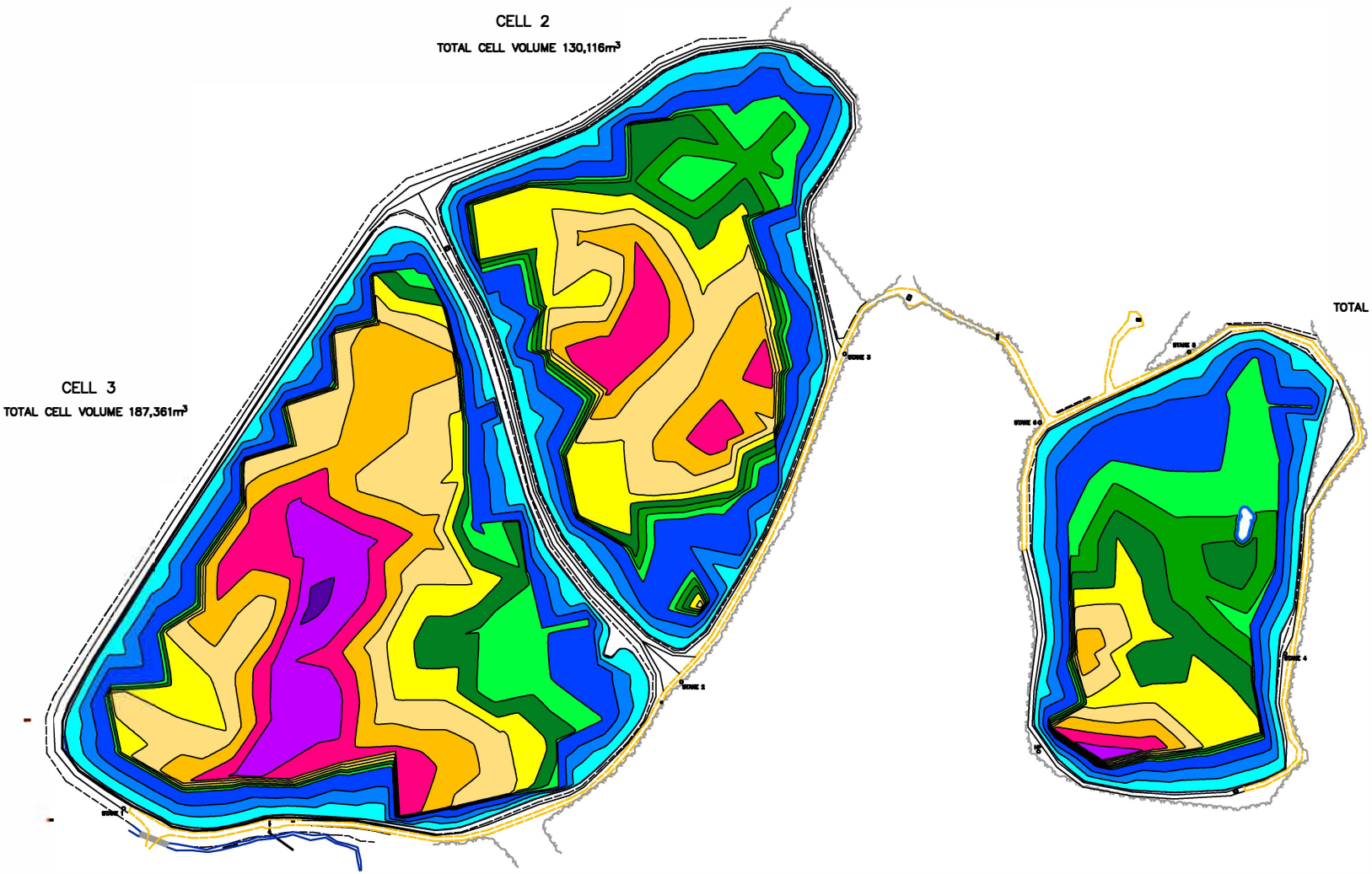
TOTAL CELL VOLUME 130,116m³

CELL 3

TOTAL CELL VOLUME 187,361m³

CELL 1

TOTAL CELL VOLUME 82,536m³



LEGEND
DEPTH OF CELL (METRES)

0.0 – 0.5	
0.5 – 1.0	
1.0 – 1.5	
1.5 – 1.6	
1.6 – 1.7	
1.7 – 1.8	
1.8 – 1.9	
1.9 – 2.0	
2.0 – 2.1	
2.1 – 2.2	
2.2 – 2.3	
>2.3	

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No.	DATE	BY	ISSUES / REVISIONS
1			

CLIENT: TOWN OF GANANOQUE

DRAWN BY:	CHECKED BY:
CTP	SAS
DESIGNED BY:	APPROVED BY:
SAS	GNL
SCALE: 1:1,000	DATE: SEPTEMBER 2007

PROJECT: GANANOQUE LAGOON SEWAGE TREATMENT SYSTEM

DRAWING: DEPTH OF CELL

PROJECT No.: 52-27908

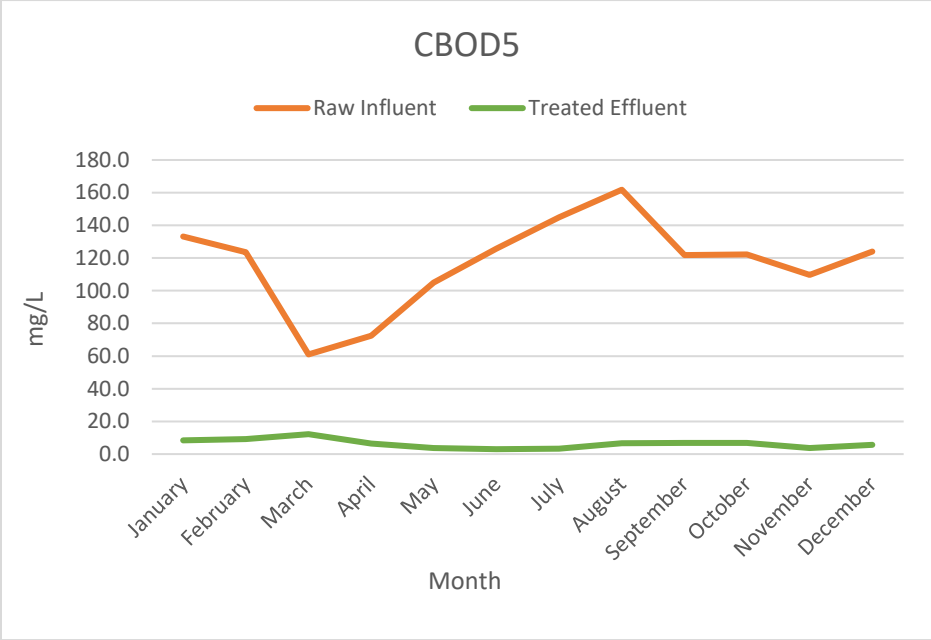
DRAWING No.: 1

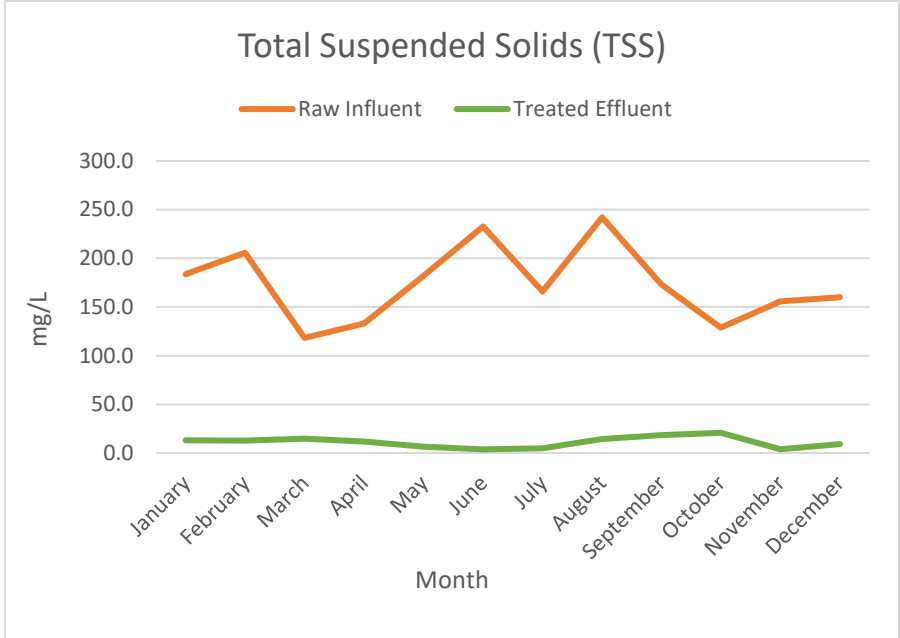
Appendix B

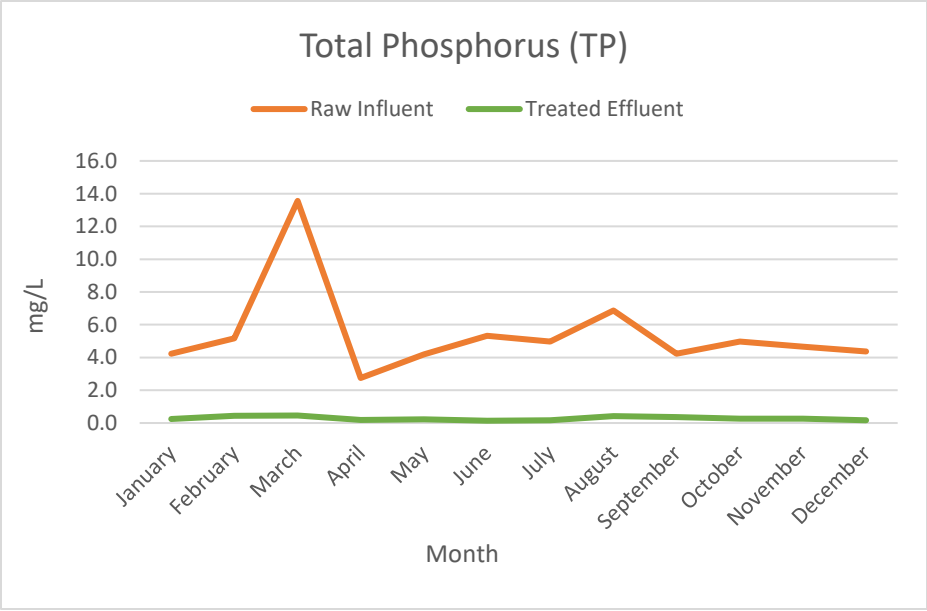
Summary Performance Report

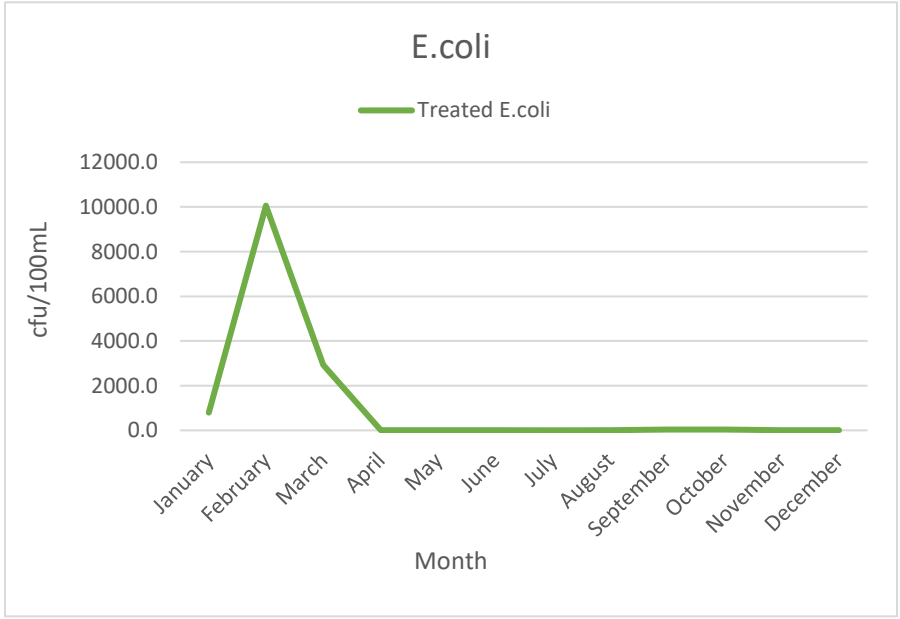
		Flows		Raw			Treated				Performance		
		Raw	Treated	Raw CBOD5	Raw TSS	Raw TP	Treated CBOD5	Treated TSS	Treated TP	E.Coli (Monthly Geometric Mean)	Removals		
Month	Days	m3	m3	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	cfu/100mL	%CBOD5	%TSS	%TP
January	31	74,578	102,624	133.25	183.50	4.23	8.50	13.25	0.25	799.05	93.62	92.78	94.09
February	28	103,185	110,856	123.50	205.75	5.17	9.25	12.75	0.44	10057.99	92.51	93.80	91.49
March	31	158,823	180,627	61.00	118.20	13.56	12.20	14.60	0.46	2921.80	80.00	87.65	96.61
April	30	143,297	187,495	72.50	133.00	2.75	6.50	11.75	0.19	3.25	91.03	91.17	93.09
May	31	107,094	134,627	105.00	182.00	4.19	3.80	6.40	0.23	3.03	96.38	96.48	94.51
June	30	96,813	104,116	125.75	232.50	5.33	3.00	3.75	0.14	1.57	97.61	98.39	97.37
July	31	78,117	54,546	145.00	165.75	4.97	3.25	5.00	0.17	1.41	97.76	96.98	96.58
August	31	72,434	62,361	161.80	242.00	6.87	6.60	14.44	0.43	4.47	95.92	94.03	93.74
September	30	86,810	78,954	121.75	173.00	4.23	6.75	18.50	0.37	35.56	94.46	89.31	91.25
October	31	88,006	111,892	122.25	128.75	4.97	6.75	20.75	0.27	36.00	94.48	83.88	94.57
November	30	93,063	99,565	109.6	155.80	4.66	3.80	4.00	0.26	8.49	96.53	97.43	94.42
December	31	122,864	130,178	124.00	160.00	4.36	5.75	9.25	0.17	8.69	95.36	94.22	96.10

GANANOQUE


CBOD5
Raw Influent
Treated Effluent
180.0
160.0
140.0
120.0
100.0
80.0
60.0
40.0
20.0
0.0
mg/L
January
February
March
April
May
June
July
August
September
October
November
December
Month


Total Suspended Solids (TSS)
Raw Influent
Treated Effluent
300.0
250.0
200.0
150.0
100.0
50.0
0.0
mg/L
January
February
March
April
May
June
July
August
September
October
November
December
Month


Total Phosphorus (TP)
Raw Influent
Treated Effluent
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
mg/L
January
February
March
April
May
June
July
August
September
October
November
December
Month


E.coli
Treated E.coli
12000.0
10000.0
8000.0
6000.0
4000.0
2000.0
0.0
cfu/100mL
January
February
March
April
May
June
July
August
September
October
November
December
Month

Appendix C

WASTEWATER TREATMENT CAPITAL PROJECTS

PROJECT NAME:	Wastewater Treatment/Construction
YEAR:	2022
COST CENTRE:	Capital reserve funded through wastewater revenues
LOCATION:	Gananoque Wastewater Treatment Lagoon System
LENGTH:	On-Going
YEAR FIRST INTRODUCED:	2020
PREPARED BY	D. Richards
DATE	November 10, 2021
SCOPE:	Provides for the capital needs for the Gananoque Wastewater Treatment System
WHY REQUIRED:	Allows for coordinated planning for equipment upgrades and maintenance
BENEFITS:	Ensures that all costs are being captured and financed through the wastewater water rates

PROJECT DESCRIPTION:	NOTES	MGR:	BUDGET:
WASTEWATER TREATMENT EAST END PUMP STATION : BLDG. & PROPERTY MNTCE:			
WASTEWATER TREATMENT EAST END PUMP STATION:			
WASTEWATER TREATMENT LAGOON:			
Ground & Road Maintenance	Lagoon Road, Berm Vegetation Maintenance	DR	125,000
Sludge Removal	Biosolids Disposal	DR	575,000
			700,000

WASTEWATER COLLECTION CAPITAL PROJECTS

PROJECT NAME:	Wastewater Collection/Construction
YEAR:	2022
COST CENTRE:	Capital reserve funded through wastewater revenues
LOCATION:	Gananoque Wastewater Collection System
LENGTH:	On-Going
YEAR FIRST INTRODUCED:	2020
PREPARED BY	D. Richards
DATE	November 10, 2021
SCOPE:	Provides for the capital needs for the Gananoque Wastewater Collection System
WHY REQUIRED:	Allows for coordinated planning for equipment upgrades and maintenance
BENEFITS:	Ensures that all costs are being captured and financed through the wastewater water rates

PROJECT DESCRIPTION:	NOTES	MGR:	BUDGET:
FULL RECONSTURCTION PROJECTS (SEWER MAINS & LATERALS)			
Engineering	Arthur Street Reconstruction	BW/DA	50,000
Service Lateral Replacements and Linning / Manhole Refurbishment	On-going program to replace failing sewer laterals and manholes	DR	25,000
WATER STREET PUMP STATION #2:			
Structure	Protective Shelter Control Panel	DR	25,000
MAIN STREET PUMP STATION #3:			
Pump #1	Pump Refurbishment	DR	15,000
STONE STREET PUMP STATION:			
Controls / Communications	PLC / SCADA Integration Upgrades	DR	50,000
			165,000

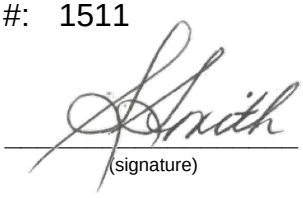
Appendix D

Ontario

Gananoque Lagoon
89 COUNTY RD 32,
LEEDS AND THE THOUSAND ISLANDS, ON,
K7G 2V3

Assessment Report

System Number: 110000285
Entity: CORPORATION OF THE TOWN OF GANANOQUE
Assessment Start Date: 06/01/2022
Assessment End Date: 06/03/2022
Assessed By: Suzanne Smith
Badge #: 1511



(signature)

NON-COMPLIANCE/NON-CONFORMANCE ITEMS

This should not be construed as a confirmation of full compliance with all potential applicable legal requirement and BMPs. These inspection findings are limited to the components and/or activities that were assessed, and the legislative framework(s) that were applied. It remains the responsibility of the owner to ensure compliance with all applicable legislative and regulatory requirements.

If you have any questions related to this inspection, please contact the signed Provincial Officer.

INSPECTION DETAILS

This section includes all questions that were assessed during the inspection.

Ministry Program: SEWAGE | **Regulated Activity:**

Question ID	980001	**Question Type**	Information
Question: What was the scope of this inspection?			
Legislative Requirement	Not Applicable		
Observation			
The primary focus of this inspection is to confirm compliance with Ministry of the Environment, Conservation and Parks (MECP) legislation as well as evaluating conformance with ministry policies and guidelines during the review period. This inspection report does not mean that all applicable legislation and regulations were evaluated. It remains the responsibility of the owner to ensure compliance with all applicable legislative and regulatory requirements. This inspection covers the calendar year of operations referenced below. The 2021 Wastewater Annual Compliance Assessment covers the period January 1, 2021 to December 31, 2021.			

Question ID	980101	**Question Type**	Legislative
Question: Does an Environmental Compliance Approval(s) exist for the sewage works?			
Legislative Requirement	OWRA | 53 | (1); OWRA | 53 | (2);		
Observation			
The sewage works has an Environmental Compliance Approval. An amended Environmental Compliance Approval (ECA) # 0999-7X8QL3 was issued November 5, 2009 for approval of a lagoon sewage treatment system serving the Town of Gananoque.			

Question ID	980601	**Question Type**	Information
Question: Where the annual average daily flow is reported to be above 80% of the rated capacity of the sewage works, has the owner initiated and/or proposed any studies or assessments to evaluate or address capacity concerns?			

Legislative Requirement	Not Applicable

Observation

The reported annual average daily flow was approaching the rated capacity of the sewage works, and the owner has not initiated any studies or assessments to evaluate or address capacity concerns. The reported annual average daily flow reported as 3,337 m3/day reflecting 62.9 (63) % of the Rated Capacity of the Works of 5,300 m3/d.

Question ID	980501	Question Type	Information

Question:

Did the sewage works report conformance with the design rated capacity for average daily flow into the sewage works?

Legislative Requirement	Not Applicable

Observation

The sewage works reported conformance with the design rated capacity during the reporting period. Effluent Objectives of ECA # 0999-7X8QL3 issued on November 5, 2009, outlined in sec. 4 (2) (b) that the Owner shall use best efforts to: (b) operate the Works within the Rated Capacity; the lagoon sewage treatment system is rated at 5,300 m3/d.

The average daily flow reporting in 2021 was 3,337 m3/day.

Question ID	980751-1	Question Type	Information

Question:

Did the sewage works report compliance with concentration limits for all parameters listed in the Environmental Compliance Approval or an Order?

Legislative Requirement	Not Applicable

Observation

The sewage works reported compliance with the concentration limits for all parameters during the reporting year.

Question ID	980751-2	Question Type	Information

Question:

Did the sewage works report compliance with the loading limits for all parameters listed in the Environmental Compliance Approval or an Order?

Legislative Requirement	Not Applicable

Observation

The sewage works reported compliance with the loading limits for all parameters during the reporting year.

Question ID	980751-3	Question Type	Information

Question:

Did the sewage works report conformance with the concentration and loading objectives for all parameters listed in the Environmental Compliance Approval?

Legislative Requirement	Not Applicable

Observation

The sewage works reported conformance with all parameters concentration and loading objectives during the reporting year.

Question ID	983201	Question Type	Legislative

Question:

Did the annual performance report meet the submission and content requirements listed in the Environmental Compliance Approval?

Legislative Requirement	OWRA | 16; OWRA | 16.1; OWRA | 16.2; OWRA | 53 | (1); OWRA | 53 | (2);

Observation

The annual performance report met the submission and contents requirements of the Environmental Compliance Approval.

Question ID	983411	Question Type	Information

Question:

Were there no by-passes or overflows events reported for the sewage works during the review period?

Legislative Requirement	Not Applicable

Observation

There were by-passes or overflow events reported for the sewage works during the review period. 2021 Record of By-Passing at the Lagoon numbered four (4).

Question ID	983421	Question Type	Information
Question: Did the information reviewed for this report demonstrate that efforts were taken to conform with Procedure F-5-5?			
Legislative Requirement	Not Applicable		
Observation			
The sewage works has demonstrated that efforts were undertaken to conform with Policy F-5-5 during the review period.			

Question ID	983441	Question Type	Information
Question: Were there no spills, other situations outside Normal Operating Conditions or abnormal discharge events for the sewage works during the review period?			
Legislative Requirement	Not Applicable		
Observation			
There were no spills, other situations outside Normal Operating Conditions or abnormal discharge events for the sewage works during the review period.			