

Moose Creek Wastewater System

Sewage Works #120002193

Annual Report

Prepared for: Township of North Stormont

Reporting Period of January 1st – December 31st 2018

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Operating Authority:



This report has been prepared to meet the requirements of Certificate of Approval #3-1555-91-936

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Operations and Compliance Reliability Indices

Compliance Event	# of Events
Ministry of Environment Inspections	0
Ministry of Labour Inspections	0
Non-Compliance	3
Spills	0
Sewer Main Blockages	0

System Process Description

Moose Creek's wastewater system began operation in 1995. It consists of a gravity fed sanitary sewage collection system, one pumping station and a wastewater treatment lagoon. The pumping station is located on Simeon Lane in Moose Creek and pumps wastewater from the collection system to the lagoon.

Moose Creek's sewage lagoon system consists of two facultative cells of equal size equipped with mechanical aeration. The cells are constructed with a high density polyethylene geomembrane liner and an underdrain system with an associated groundwater pumping station to prevent uplift of the liner. The total capacity of the lagoon system is 110,376 m³. A chemical injection building is located on site housing a 10,000 litre storage tank and two chemical feed pumps (one duty and one standby). Aluminum sulphate is injected for phosphorus control as wastewater is pumped to the lagoons.

The lagoon operates on an annual discharge basis in accordance with the Certificate of Approval. Effluent is discharged through a 400 mm outfall to the Moose Creek Drain.

Groundwater Monitoring Program

A groundwater monitoring/liner integrity program was initiated in 1995 as required under Condition 16 of the facility's Certificate of Approval. The initial findings indicated that groundwater at the lagoon site was characterized by nitrate and bacteriological contamination, likely associated with the historical agricultural use of the property. Appendix B contains the results of the 2018 Groundwater Monitoring Program carried out in accordance with the protocol set out in Golder Associates' report dated April 16, 2002. The report sets the lagoon liner leak trigger mechanism at >0.33 mg/L nitrite or >3.36 mg/L nitrate at the underdrain. Spring and fall underdrain nitrite levels were both <0.10 mg/L while the nitrate levels were 0.36 mg/L and <0.10 mg/L, respectively. Groundwater sample results have remained fairly consistent over the duration of the program. The overall consistency of the data indicates that the lagoons have not adversely affected the quality of the groundwater.

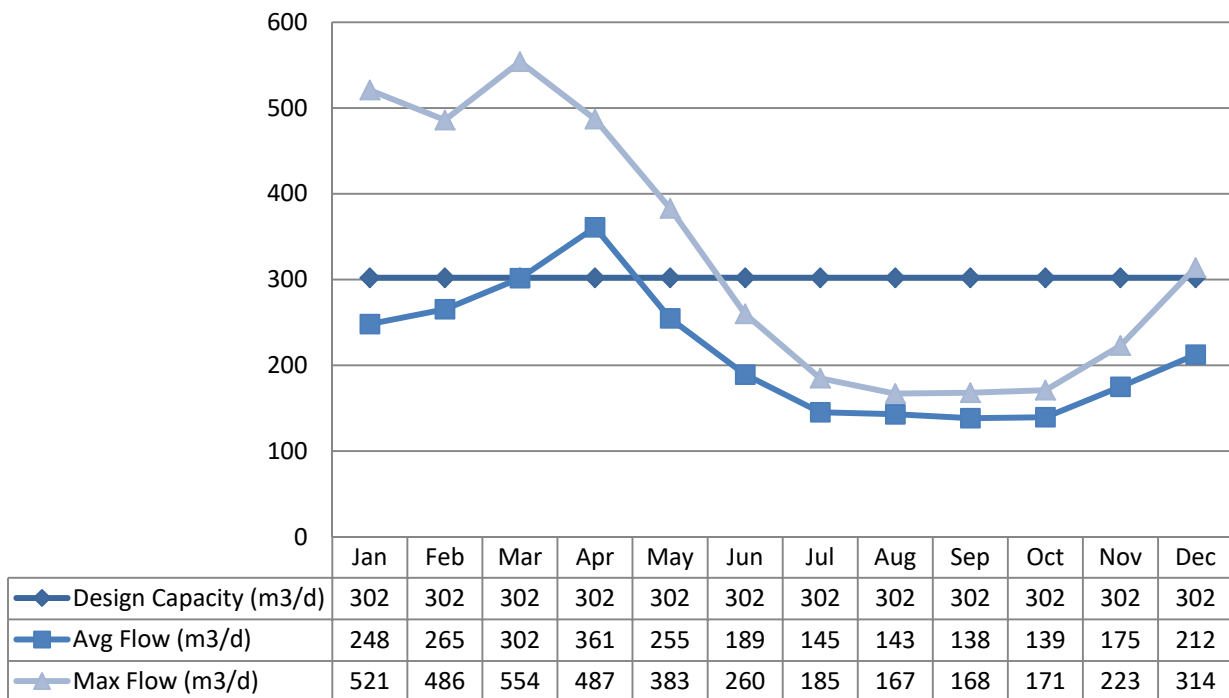
The charts in Appendix B illustrate historical spring and fall groundwater elevations in the lagoon’s monitoring wells since 2002. The monitoring wells are arranged on the charts based on groundwater flow direction. The data indicates that the difference in elevation as the groundwater flows down gradient has remained relatively consistent over the duration of the monitoring program. It is expected that if groundwater mounding occurred at the site, the difference in elevation as the water flowed down gradient would begin to diminish. OCWA will continue to utilize the existing groundwater monitoring program in 2019.

Wastewater System Flows

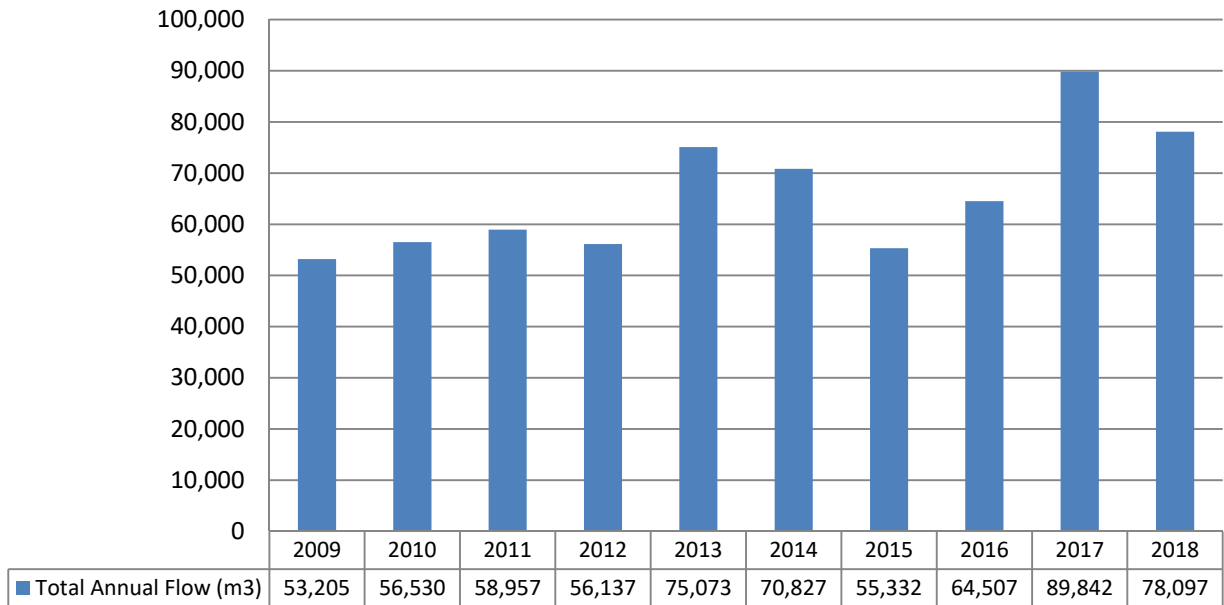
The hydraulic flows reaching the sewage lagoons in 2018 averaged 214 m³/day which represents 71% of the 302 m³/day design capacity.

Raw Flows

2018 Raw Flows:

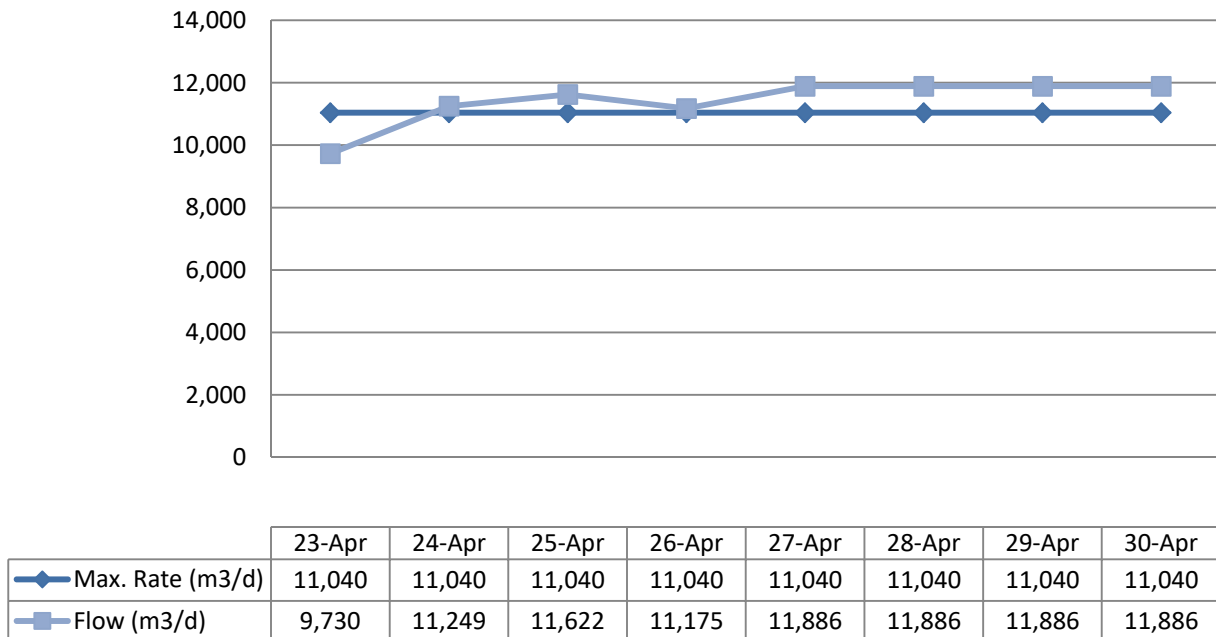


Annual Raw Flow Comparison:



Effluent Flow

A total of 91,320 m³ was discharged from Moose Creek’s sewage lagoons in the spring of 2018. The maximum allowable flow of 11,040 m³/d was exceeded during the discharge as depicted below. Please refer to the non-compliance correspondence to the Ministry attached in Appendix D for details.



Effluent Quality Assurance or Control Measures

Effluent control measures include pre-discharge sampling and testing of lagoon cell contents prior to discharge. The samples are collected by the Ontario Clean Water Agency's competent and licensed staff using approved methods and protocols for sampling including those specified in the Ministry's Procedure F-10-1, "Procedures for Sampling and Analysis Requirements for Municipal and Private Sewage Treatment Works", the Ministry's publication, "Protocol for the Sampling and Analysis of Industrial/Municipal Wastewater" and the publication, "Standard Methods for the Examination of Water and Wastewater".

Based on the total phosphorus results from cells contents sampling prior to discharge, this lagoon system may be batched dosed with aluminum sulphate for phosphorus control.

All effluent samples collected during the reporting period were submitted to Eurofins laboratory in Ottawa for analysis, with the exception of pH and temperature. Eurofins is accredited by the Canadian Association for Laboratory Accreditation (CALA). Accredited labs must meet strict provincial guidelines including an extensive quality assurance/quality control program. By choosing this laboratory, OCWA is ensuring appropriate control measures are undertaken during sample analysis.

The pH and temperature were analyzed in the field at the time of sample collection by certified operators to ensure accuracy and precision of the results obtained.

Effluent Quality

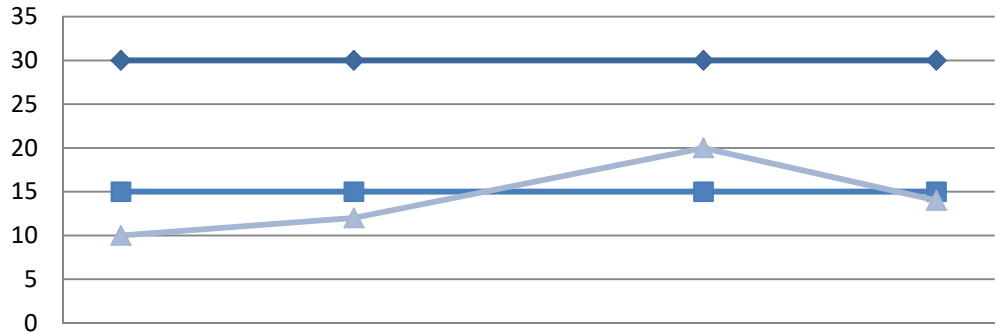
The seasonal average effluent objective and limit for total suspended solids (TSS) were exceeded during the lagoon discharge. In addition, the objective for total phosphorus was slightly exceeded. Please refer to the non-compliance correspondence to the Ministry attached in Appendix C and the 'Operational Issues' section of this report for details.

The effluent results from the spring discharge are tabulated below. Further details on the discharge sampling results including the upstream and downstream sample results can be found in the Lagoon Performance Assessment Report (Appendix A).

Carbonaceous Biochemical Oxygen Demand (5-Day)

Discharge Period	Seasonal Average	Limit	Objective	Exceedance
Spring	14.0	30	15	No

Effluent CBOD₅ Results:



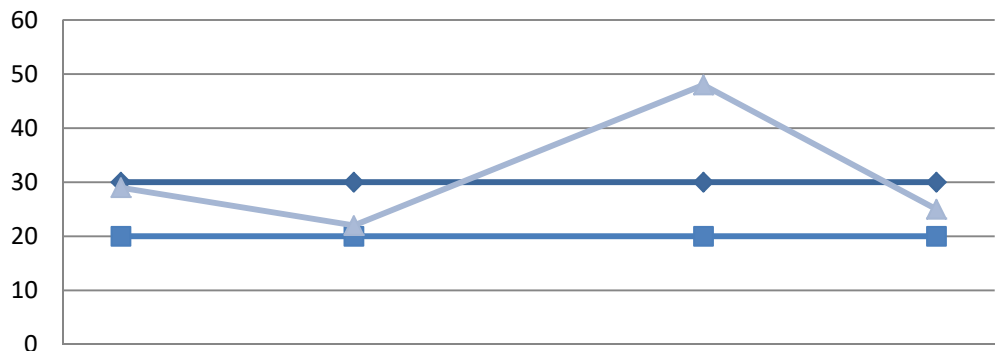
	23-Apr	25-Apr	28-Apr	30-Apr
◆ Limit (mg/L)	30	30	30	30
■ Objective (mg/L)	15	15	15	15
▲ Result - Spring (mg/L)	10	12	20	14

Total Suspended Solids

Discharge Period	Seasonal Average	Limit	Objective	Exceedance
Spring	31.0	30	20	Yes*

*The average concentration for TSS exceeded the objective and limit specified in the C of A. Please see the non-compliance correspondence to the Ministry attached in Appendix D.

Effluent TSS Results:

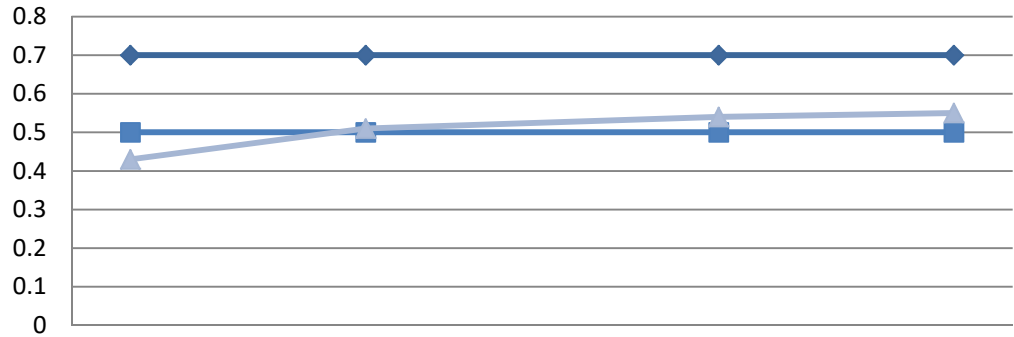


	23-Apr	25-Apr	28-Apr	30-Apr
◆ Limit (mg/L)	30	30	30	30
■ Objective (mg/L)	20	20	20	20
▲ Result - Spring (mg/L)	29	22	48	25

Total Phosphorus

Discharge Period	Seasonal Average	Limit	Objective	Exceedance
Spring	0.51	0.7	0.5	Yes – Objective

Effluent TP Results:

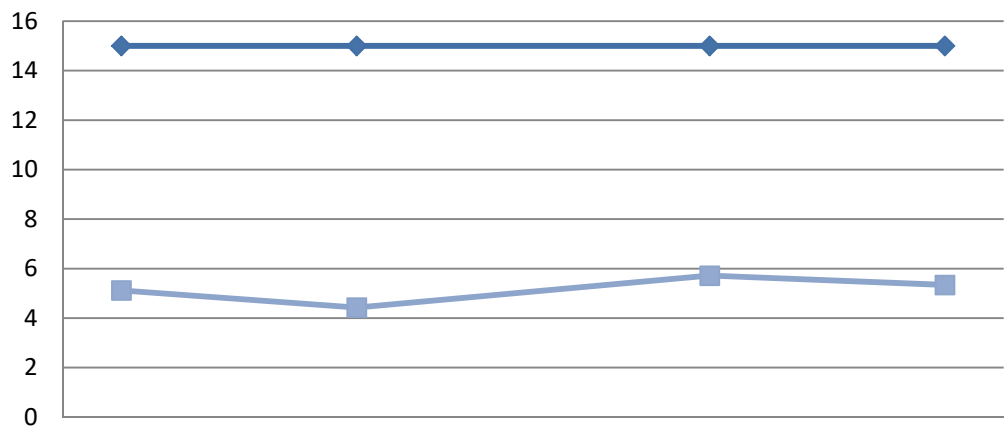


	23-Apr	25-Apr	28-Apr	30-Apr
◆ Limit (mg/L)	0.7	0.7	0.7	0.7
■ Objective (mg/L)	0.5	0.5	0.5	0.5
▲ Result - Spring (mg/L)	0.43	0.51	0.54	0.55

Total Ammonia Nitrogen

Discharge Period	Seasonal Average	Limit	Objective	Exceedance
Spring	5.2	15	n/a	No

Effluent TAN Results:

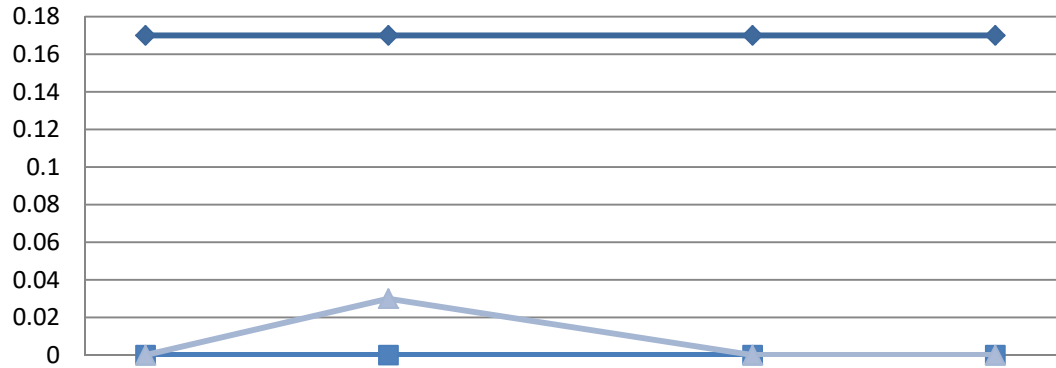


	23-Apr	25-Apr	28-Apr	30-Apr
◆ Limit (mg/L)	15	15	15	15
■ Result - Spring (mg/L)	5.12	4.43	5.7	5.3

Hydrogen Sulphide

Discharge Period	Seasonal Average	Limit	Objective	Exceedance
Spring	<0.03	0.17	Absent	No

Effluent Undissociated H₂S Results:

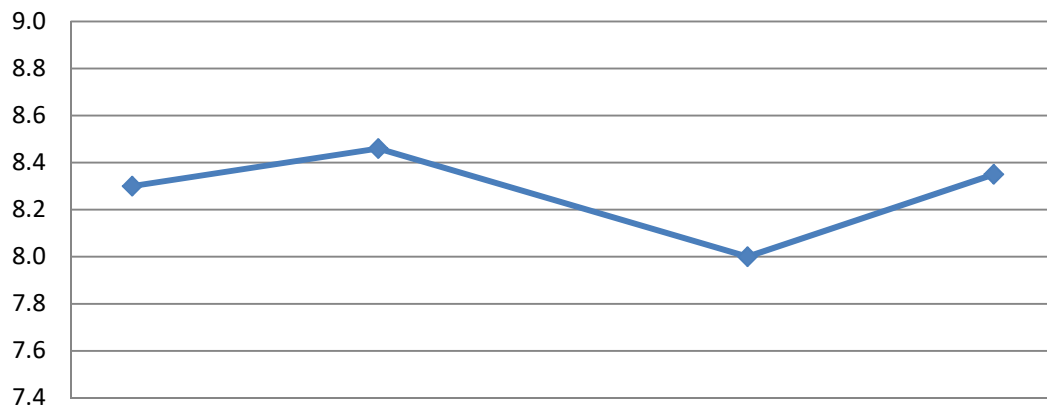


	23-Apr	25-Apr	28-Apr	30-Apr
◆ Limit (mg/L)	0.17	0.17	0.17	0.17
■ Objective (mg/L)	0	0	0	0
▲ Result - Spring	0	0.03	0	0

pH

Discharge Period	Seasonal Average	Limit	Objective	Exceedance
Spring	8.27	n/a	n/a	n/a

Effluent pH Results:



	23-Apr	25-Apr	28-Apr	30-Apr
◆ Result - Spring	8.3	8.5	8.0	8.4

There are no pH objectives or limits specified in the Certificate of Approval.

Operating Issues

Historically, ammonia compliance during the spring discharge has been an issue for Moose Creek's lagoons. In an effort to enhance nitrification within the lagoon cells, the blowers are operated on a daily basis in advance of the spring discharge. The early blower operation helps dissolve the ice caps and increase the oxygen content of the wastewater, which encourages re-establishment of the nitrifying bacteria population.

In the spring of 2018, cold temperatures extending well into the permitted discharge period delayed the start of Moose Creek's lagoon discharge. The blowers in both cells were started on March 13, 2018, but persistent cold temperatures into April caused enough ice to remain on the lagoons that batch dosing by boat had to be delayed. OCWA batch dosed the lagoons with aluminum sulphate on Friday, April 20th and started the discharge on Monday, April 23rd. In attempt to ensure enough capacity until the next discharge period and remain within the discharge time frame specified in the Certificate of Approval, the flow rate was maintained at approximately the maximum allowed. However, the daily maximum of 11,040 m³/day specified in section 13(2) was slightly exceeded on most days during the discharge. It should be noted that stream flows remained higher than normal in the receiving stream throughout the discharge period.

Elevated TSS concentrations occurred throughout the spring discharge in 2018. The seasonal average limit and objective were both exceeded. It is suspected that algae caused the elevated TSS in the effluent samples. In conjunction with the high flow rates this also resulted in the average loading for TSS over the discharge period to exceed the limit of 331 kg/d.

Maintenance

Flow Meter Calibration and Maintenance

Copies of the flow meter calibration certificates for 2018 are attached in Appendix C.

Maintenance Summary

Description
- performed routine sewer flushing and wet well cleaning
- performed routine camera inspection of sewer mains
- repaired/upgraded manholes in collection system
- performed pest control at lagoon
- repaired alum process piping
- replaced damaged gates at lagoon

Notice of Modifications

Date	Process	Modification	Status
None to report.			

Sludge Generation

Sludge depth is monitored periodically, and plans for sludge removal are made as required for optimal operation of the lagoon system.

Summary of Complaints

There were no complaints documented during the reporting period.

Summary of Abnormal Discharge Events

Bypass/Overflow

No bypasses or overflows occurred during the reporting period.

Spills

No overflows occurred during the reporting period.

Appendix A

Performance Assessment Reports

ONTARIO CLEAN WATER AGENCY PERFORMANCE ASSESSMENT REPORT

MUNICIPALITY: **TOWNSHIP OF NORTH STORMONT**
 PROJECT: **MOOSE CREEK WASTEWATER TREATMENT FACILITY**
 PROJECT NUM.: **6990**
 WORKS NUM.: **120002193**
 DESCRIPTION: **TWO CELL FACULATATIVE AERATED LAGOON SYSTEM C/W ONE SEWAGE PUMPING STATION AND
 CONTINUOUS ALUM FEED SYSTEM FOR PHOSPHORUS REMOVAL**

YEAR: **2018**
 WATER COURSE: **MOOSE CREEK**
 DESIGN CAPACITY: **302 m³/d**

MONTH	FLOWS					DISCHARGE DURATION (days)	ALUM	BIOCHEMICAL O2 DEMAND			SUSPENDED SOLIDS			PHOSPHORUS			TKN
	TOTAL FLOW (m ³)	AVG DAY FLOW (m ³)	MAX DAY FLOW (m ³)	EFFLUENT FLOW (m ³)			AVG DOSE (mg/L)	AVG RAW BOD (mg/L)	AVG EFF CBOD (mg/L)	PERCENT REMOVAL (%)	AVG RAW SS (mg/L)	AVG EFF SS (mg/L)	PERCENT REMOVAL (%)	AVG RAW PHOS. (mg/L)	AVG EFF PHOS. (mg/L)	PERCENT REMOVAL (%)	AVG RAW TKN (mg/L)
JAN	7,692	248	521			11.9	145			363			7.81			74.8	
FEB	7,430	265	486			10.8	326			270			6.93			77.5	
MAR	9,348	302	554			13.5	130			136			3.57			37.7	
APR	10,826	361	487	91,320	8	12.7	42	14		213	31		3.13	0.51		36.5	
MAY	7,896	255	383			14.4	146			324			3.8			58.6	
JUN	5,674	189	260			13.7	124			196			5.67			47.1	
JUL	4,501	145	185			15.7	132			336			5.2			46.3	
AUG	4,428	143	167			16.2	242			350			10.9			81.3	
SEPT	4,148	138	168			12.8	197			278			6.95			36.2	
OCT	4,321	139	171			16.6	232			222			8.09			92.4	
NOV	5,249	175	223			10.4	242			344			2.17			99.3	
DEC	6,584	212	314			29.9	127			130			3.55			42.9	
TOTAL	78,097			91,320	8												
AVG		214				14.9	174	14	91.9	264	31.0	88.2	5.65	0.51	91.0	60.9	
MAX			554				326			363			10.9				
CRITERIA		302			20			30			30			0.7			
COMPLIANCE		YES			YES			YES			NO			YES			

	ACTUAL	CRITERIA	COMPLIANCE
START DATE	Apr. 23	Mar.15	YES
END DATE	Apr. 30	Apr.30	YES
MAX DURATION (DAYS)	8	20	YES

COMMENTS: **PERCENT REMOVAL BASED ON 12 MONTHS OF RAW COMPOSITE SAMPLES**

**ONTARIO CLEAN WATER AGENCY
LAGOON PERFORMANCE ASSESSMENT REPORT**

MUNICIPALITY: **TOWNSHIP OF NORTH STORMONT**
 PROJECT: **MOOSE CREEK LAGOON SYSTEM**
 PROJECT #: **6990**
 DESCRIPTION: **TWO CELL FACULTATIVE AERATED LAGOON SYSTEM WITH ONE SEWAGE PUMPING STATION AND CONTINUOUS ALUM FEED SYSTEM FOR PHOSPHORUS REMOVAL**

YEAR: **2018**
 WATER COURSE: **SOUTH NATION RIVER**
 DESIGN CAPACITY: **302 m³/day**

GRAB SAMPLE	SAMPLE RESULTS								91,320 m ³	
	SAMPLE DATE	23-Apr	25-Apr	28-Apr	30-Apr	Average	C OF A OBJECTIVE	C OF A LIMIT		
START, END, AND EVERY 0.5 M OF DRAWDOWN DURING DISCHARGE	CBOD	10	12	20	14	14.0	15.0	30		
	TSS	29	22	48	25	31.0	20.0	30		
	TP	0.43	0.51	0.54	0.55	0.51	0.5	0.7		
	NH ₃ + NH ₄	5.12	4.43	5.7	5.3	5.2	N/A	15		
	H ₂ S	<0.02	0.03	<0.02	<0.05	0.019	ABSENT	0.17		
	TKN	13.4	12.6	14.4	14.3					
	Nitrite	<0.10	<0.10	<0.10	<0.10					
	Nitrate	<0.10	<0.10	0.14	0.18					
	pH (on site)	8.3	8.46	8	8.35					
	Conductivity (on site)	700	600	620	660					
AT LAGOON EFFLUENT DISCHARGE OUTFALL STRUCTURE	Temp (on site)	7.1	8.5	8.8	10					
	<i>E. coli</i>	330	<10	<10	1820					
	un-ionized NH ₃ (calc)**	0.09	0.11	0.17	0.13					
	undissociated H ₂ S**	ND	0.0015	ND	ND					

CBOD/SS/TP exceed when the seasonal average exceeds criteria
 NH₃/NH₄ & H₂S exceed when single sample result exceed
 **Undissociated H₂S, unionized NH₃, based on in-house calculations

	AVG. LOADING	C OF A LIMIT
CBOD (kg/d)	159.8	331
TSS (kg/d)	353.9	331
TP (kg/d)	5.8	7.7
NH ₃ + NH ₄ (kg/d)	58.8	166
H ₂ S (kg/d)	ND	1.9

	23-Apr	24-Apr	25-Apr	26-Apr	27-Apr	28-Apr	29-Apr	30-Apr
DISCHARGE FLOW (m ³ /d)	9,730	11,249	11,622	11,175	11,886	11,886	11,886	11,886

Daily Loading	23-Apr	24-Apr	25-Apr	26-Apr	27-Apr	28-Apr	29-Apr	30-Apr	Average
BOD (kg)	97.3	135.0	139.5	223.5	237.7	237.7	166.4	166.4	175.4
TSS (kg)	282.2	247.5	255.7	536.4	570.5	570.5	297.2	297.2	382.1
TP (kg)	4.2	5.7	5.9	6.0	6.4	6.4	6.5	6.5	6.0
NH ₃ (kg)	49.8	49.8	51.5	63.9	68.0	68.0	63.5	63.5	59.7
H ₂ S (kg)	ND	0.34	0.35	ND	ND	ND	ND	ND	N/A

UPSTREAM RESULTS					
SAMPLE DATE	23-Apr	25-Apr	28-Apr	30-Apr	
CBOD	1	1	1	<1	
TSS	4	4	4	33	
TP	0.05	0.08	0.08	0.11	
NH ₃ + NH ₄	<0.05	0.14	<0.05	0.14	
H ₂ S	<0.01	<0.01	0.01	0.03	
TKN	1.2	1	1.2	1.5	
Nitrite	<0.10	<0.10	<0.10	<0.10	
Nitrate	1.99	2.01	2.88	3.19	
pH	8	8.07	8.30	8.25	
Conductivity	950	810.0	940	980	
Temp (on site)	6.4	7.1	7.9	7.7	
<i>E. coli</i>	10	<10	<10	40	

DOWNSTREAM RESULTS					
SAMPLE DATE	23-Apr	25-Apr	28-Apr	30-Apr	
CBOD	1	5	5	3	
TSS	4	25	31	19	
TP	0.05	0.22	0.19	0.16	
NH ₃ + NH ₄	0.06	1.51	2.32	0.85	
H ₂ S	<0.02	<0.01	<0.01	<0.01	
TKN	0.9	4.6	4.4	3.3	
Nitrite	<0.10	<0.10	<0.10	<0.10	
Nitrate	1.96	1.92	2	2.34	
pH	8.1	8.23	8.30	8.20	
Conductivity	950	720	880	890	
Temp (on site)	6.0	6.9	7.8	7.7	
<i>E. coli</i>	<10	10	<10	560	

CELL CONTENTS/ PRE DISCHARGE SAMPLES	West		East	
	10-Apr-18			
SAMPLE DATE	10-Apr-18			
CBOD (mg/L)	34	4		
TSS (mg/L)	19	17		
TP (mg/L)	0.88	0.61		
NH ₃ + NH ₄ (mg/L)	6.16	7.43		
TKN (mg/L)	12.1	11.9		
S ₂ -	0.02	<0.01		
<i>E. coli</i>	940	850		

**ONTARIO CLEAN WATER AGENCY
MOOSE CREEK SEWAGE LAGOON 2018**

DETERMINATION OF UN-IONIZED AMMONIA (NH₃) IN WASTEWATER EFFLUENT

Sample Date	Sample Stream Temperature (°C)	Degrees Kelvin	Dissociation Constant pKa	Sample pH on-site	Fraction of Un-ionized Ammonia	Total Ammonia (mg/L) (NH₃ +NH₄+as N)	Un-ionized Ammonia (mg/L)
23-Apr	6.0	279.15	9.87	8.1	0.0167	5.12	0.09
25-Apr	6.9	280.05	9.84	8.23	0.0241	4.43	0.11
28-Apr	7.8	280.95	9.81	8.30	0.0302	5.72	0.17
30-Apr	7.7	280.85	9.81	8.20	0.0239	5.34	0.13

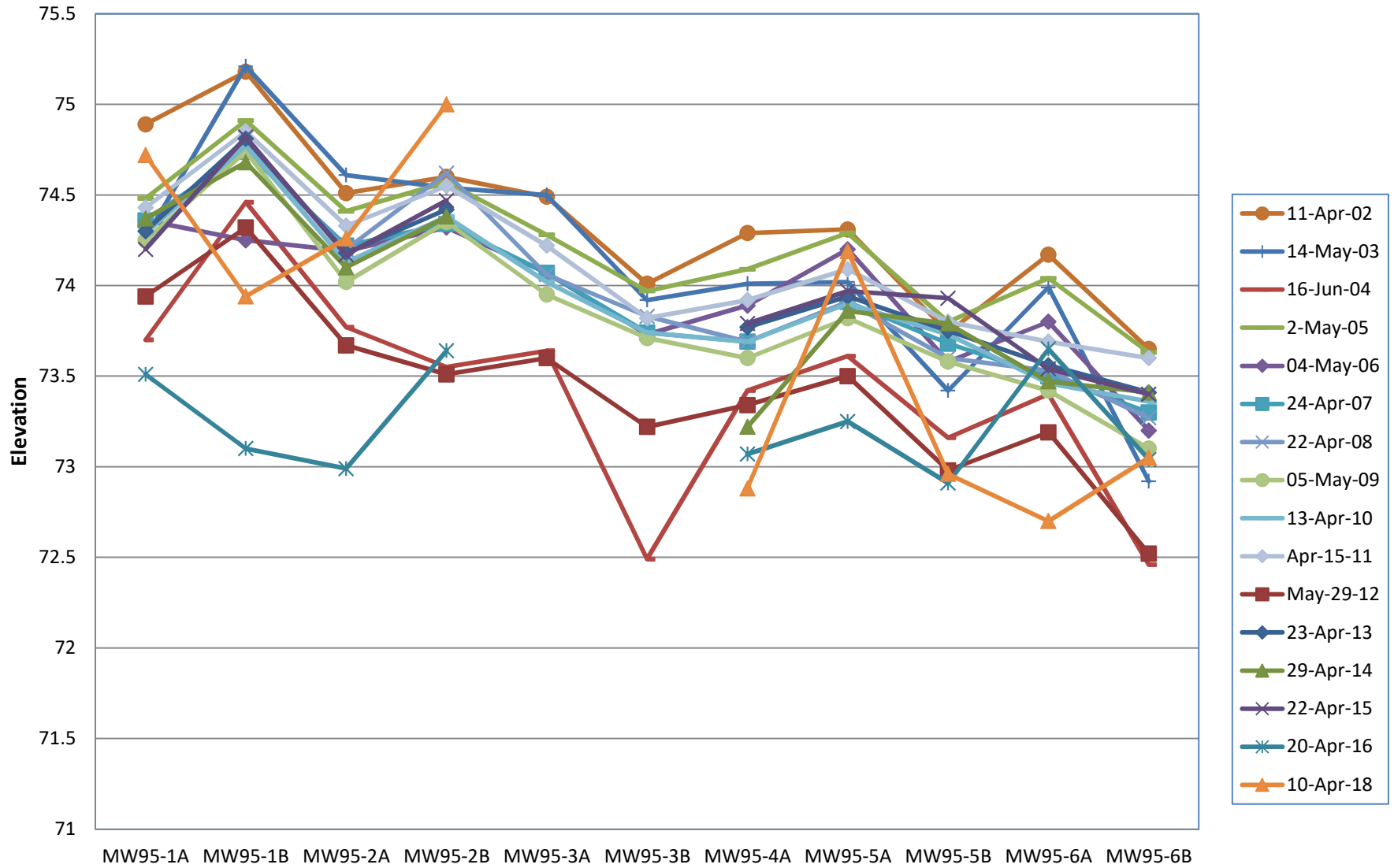
Appendix B

Groundwater Monitoring Results

Lagoon Underdrain Ground Water Monitoring - Lab Results

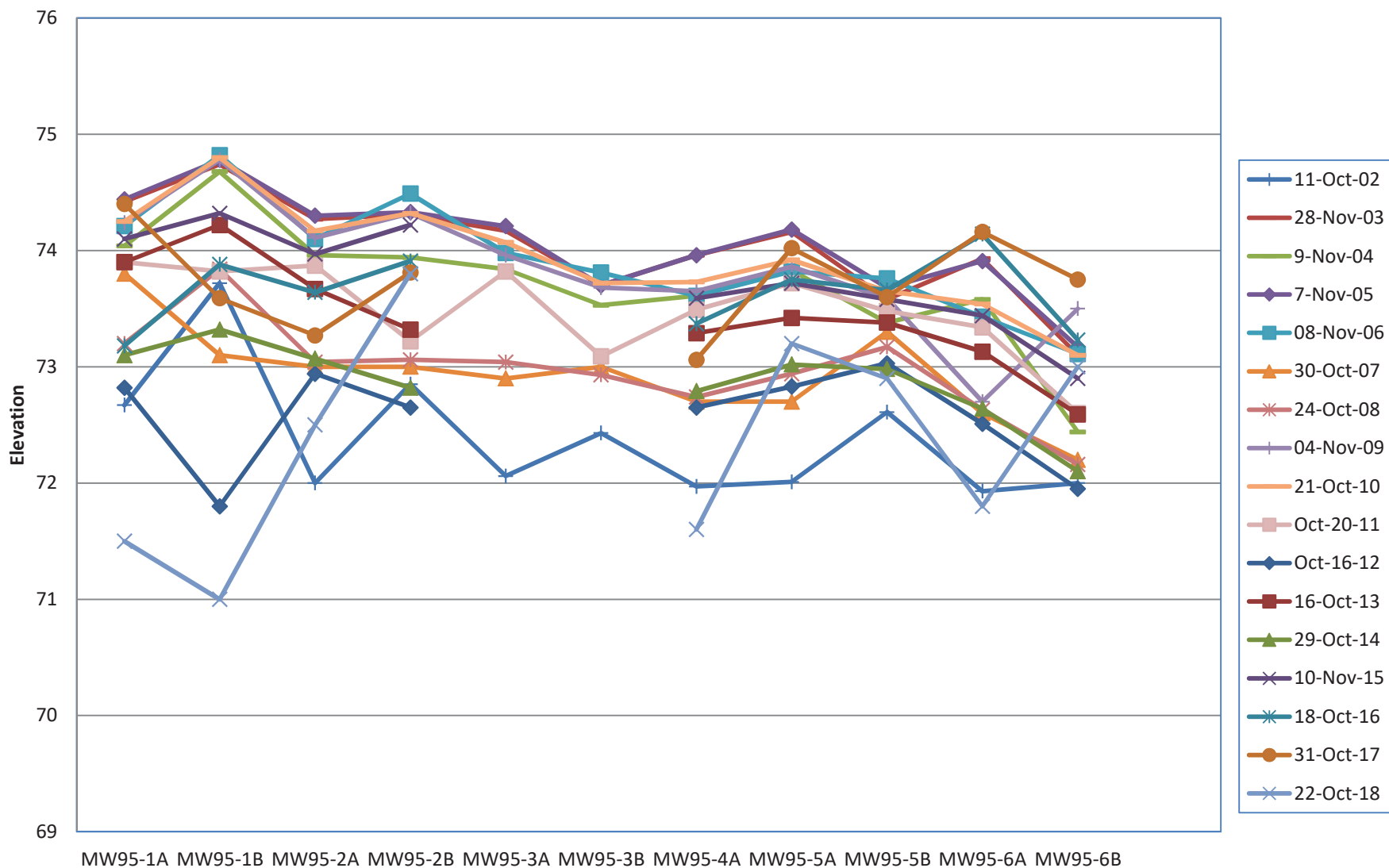
	DATE	29-Apr-14	29-Oct-14	22-Apr-15	10-Nov-15	20-Apr-16	18-Oct-16	31-Oct-17	10-Apr-18	22-Oct-18
Monitor 95-1A										
	Total Coliforms	<10	1500	100	10	<10	<10	1600	50	<10
	Faecal Coli	<10	250	<10	0	<10	<10	<10	<10	<10
	DRP	0.03	0.03	0.03	0.06	0.04	0.02	0.03	<0.03	<0.03
	Ammonia (N-NH3)	0.08	0.12	0.21	0.063	0.324	0.184	0.65	0.36	0.35
	Nitrite (N-N02)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
	Nitrate (N-NO3)	0.10	0.22	<0.10	0.26	<0.10	<0.10	<0.10	0.36	0.12
	Total Phosphorus	0.39	0.46	1.36	0.48	0.96	2	0.24	1.2	1.05
	Conductivity	387	371	403	388	399	614	378	398	412
	pH	8.28	8.17	8.21	8.33	8.16	7.87	8.23	8.28	8.15
Monitor 95-1B										
	Total Coliforms	<10	<10	<10	6	<10	<10	300	<10	20
	Faecal Coli	<10	<10	<10	0	<10	<10	<10	<10	<10
	DRP	<0.01	0.01	0.01	0.1	0.03	0.03	<0.03	<0.03	<0.03
	Ammonia (N-NH3)	0.12	0.04	0.14	<0.025	0.066	0.197	0.19	0.23	0.46
	Nitrite (N-N02)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
	Nitrate (N-NO3)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
	Total Phosphorus	0.43	1.20	0.41	0.35	0.44	1.39	0.33	1.02	11.7
	Conductivity	742	660	743	754	721	405	959	896	830
	pH	7.91	7.71	7.7	8.12	0.03	8.13	7.56	7.72	8.15
MCL-2000										
Lagoon in Use	Total Coliforms	2700	114000	24000	18000	140	140	38000	3910	8000
	Faecal Coli	210	35000	2770	3900	<10	<10	4920	1480	4900
	DRP	<0.01	0.27	0.98	0.86	<0.01	0.78	0.11	1.25	0.03
	Ammonia (N-NH3)	12.7	19.0	21.6	10.5	<0.025	12.3	3.38	9.3	7.54
	Nitrite (N-N02)	<0.10	<0.10	<0.10	0.11	<0.10	<0.10	<0.10	<0.10	<0.10
	Nitrate (N-NO3)	<0.10	0.21	<0.10	<0.10	<0.10	<0.10	0.1	<0.10	<0.10
	Total Phosphorus	0.33	1.56	1.62	1.46	<0.01	3.62	1.41	1.5	0.17
	Conductivity	855	943	1000	988	655	1020	636	798	902
	pH	7.8	7.79	7.89	8.3	8.07	7.58	7.89	7.9	8.04
MCL-1000										
Lagoon Underdrain	Total Coliforms	10	120	30	20	<10	<10	250	70	30
	Faecal Coli	<10	10	<10	0	<10	<10	<10	<10	<10
	DRP	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.03	<0.03	<0.03
	Ammonia (N-NH3)	0.16	<0.02	0.14	<0.025	0.517	<0.025	0.13	0.12	0.11
Trigger >0.33mg/L	Nitrite (N-N02)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Trigger >3.36mg/L	Nitrate (N-NO3)	0.74	0.26	0.5	0.76	<0.10	0.25	0.45	0.36	<0.10
	Total Phosphorus	0.06	0.03	0.02	<0.05	0.070	0.012	0.04	0.07	0.02
	Conductivity	894	894	885	869	872	884	872	385	974
	pH	7.58	7.80	7.54	8.1	7.48	7.77	7.91	7.96	7.96

Appendix B: Spring Groundwater Elevations



* No levels available from MW95-3A & MW95-3B since fall 2012 as the wells were damaged.

Appendix B: Fall Groundwater Elevations



* No levels available from MW95-3A & MW95-3B since fall 2012 as the wells were damaged

Appendix C

Flow Meter Calibration Certificates



Work Order #	699569	Meter Flow Verification (1y) 6990	Status	APPR
Job Plan #	METFLO01-A	METER FLOW ANNUAL GENERIC		
Project	NORSTM6990S-000			
Type	PM		Scheduled Start Date	03-Mar-18
Criticality	3			
Class	CALIBRATION			

Location	6990, Moose Creek WW Lagoon & CS
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Reported By	MAXADMIN
Lead	
Crew Work Group	1225 Meter Flow Verification Team 2 Chesterville

Sequence	Asset	Location	Inspected
1	0000101073 METER FLOW LAGOON DISCHARGE	6990-WLMO-P-PC 6990, Moose Creek WW Lagoon & CS, Process, Process Control & Monitoring	<input checked="" type="checkbox"/>
2	0000101087 METER FLOW MOOSE CREEK RAW SEWAGE	6990-WLMO-P-PC 6990, Moose Creek WW Lagoon & CS, Process, Process Control & Monitoring	<input checked="" type="checkbox"/>

Safety Message

This Work Order (and accompanying Maintenance Procedure) have been developed to aid field personnel in the care and maintenance of the specified equipment. However, maintenance personnel are expected to look for and correct any defects which are not anticipated in the procedure. This document may not provide all the technical information that may be required, and it may be necessary to refer to the manufacturer's manual for further details.

The "As Found" and "As Left" readings, as well as any abnormalities found and any repairs carried out, are to be recorded in the Maximo WMS System.

Isolate and de-energize equipment in accordance with the lock-out procedure.

Take time to identify hazards and plan how each hazard will be eliminated or controlled. Work practices must be in accordance with the Occupational Health & Safety Act and the Ontario Clean Water Agency safety manual.

Ensure direct supervisor or their designate have been notified of entry into the site. This notification should provide approximate time and duration. On completion of duties notification is to be given that site has been vacated and secured.



Task	Description
10	<p>RUNNING CHECKS</p> <p>1) Verify calibration parameters and programming parameters where applicable.</p> <p>2) Ensure proper connections and grounding.</p> <p>3) Check display for any alarm or error codes.</p>
20	<p>HAVE QUALIFIED TECHNICIAN CALIBRATE UNIT</p> <p>1. Have a qualified technician calibrate the unit, using actual flow method or flow simulator.</p> <p>2. Calibration records must be kept for a period of five years.</p> <p>3. Records shall include the level of accuracy of the equipment as found and as left.</p> <p>4. Calibration test equipment shall be certified annually and certification dates recorded on the calibration record. Some test equipment may not require calibration</p>
30	<p>RECORD ADJUSTMENTS AND VERIFY OUTPUTS</p> <p>1. Record any adjustments, modifications or replacements made to the equipment during the calibration.</p> <p>2. Verify accuracy of electronic outputs to the end device as required based on theoretical versus actual values . {Chart recorders, SCADA, Outpost 5}.</p> <p>3. Ensure all nameplate data is recorded and entered in WMS.</p>
40	<p>COMPLETE A VERIFICATION SHEET FOR EACH FLOW METER, POST IT AND ATTACH TO WORK ORDER</p> <p>Note: Calibration sheet must be signed and original kept on site in the SOP binder.</p>

For Field-Use Only - Completion Elements:

Work Log: Annual Inspection & Calibration of flow Meter Completed

Labour			
Date	Reg/Prem.	Hours	Memo



Completed By

Please Print Name

Stephane Barbarie

Signature

Stephane Barbarie

Date

April 13, 2018

Appendix D

Non-Compliance Correspondence to MECP

May 18, 2018

Mr. James Mahoney
 Supervisor, Ministry of the Environment and Climate Change
James.Mahoney@ontario.ca

Subject: Moose Creek Sewage Lagoon - Notification of Non-Compliance

This letter provides notification of non-compliance with the effluent concentration and loading limit for TSS outlined in section 12(2) and the maximum flow rate specified in section 13(2) of Certificate of Approval No. 3-1555-91-936. This letter confirms the verbal notification of non-compliance provided by OCWA to the Ontario Ministry of the Environment and Climate Change's Spills Action Centre on May 11, 2018 (Reference # 0750-AYNLAF).

The following effluent parameters were exceeded:

Parameter	Type of Limit	Type of Sample	Result	C of A Limit
Total Suspended Solids	Seasonal Average Concentration	Grab	31.0 mg/L	30.0 mg/L
Total Suspended Solids	Seasonal Average Loading	Calculation	382 kg/d	331 kg/d

The spring discharge of Moose Creek's sewage lagoons began on April 23, 2018 and ended on April 30, 2018. Four samples were collected during the discharge on April 23, April 25, April 28, and April 30. The concentration of total suspended solids in the samples was 29, 22, 48 and 25 respectively.

Cold temperatures extending well into the permitted discharge period delayed the start of the spring discharge. The blowers in both cells were started on March 13, 2018, but persistent cold temperatures into April caused enough ice to remain on the lagoons that batch dosing by boat had to be delayed. OCWA batch dosed the lagoons with aluminum sulphate on Friday April 20th and started the discharge on Monday, April 23rd. In attempt to ensure enough capacity until the next discharge period and remain within the discharge time frame specified in the Certificate of Approval, the flow rate was maintained at approximately the maximum allowed. However, the daily maximum of 11,040 m³/day specified in section 13(2) was slightly exceeded on most days during the discharge. Please see the attached PAR for details. It should be noted that stream flows remained higher than normal in the receiving stream throughout the discharge period. The elevated TSS concentrations in conjunction with the high flow rates resulted in the average loading for TSS over the discharge period to exceed the limit of 331 kg/d.

It should also be noted that all other parameters remained well below the C of A limits throughout the discharge. A complete listing of all sample results obtained during the spring discharge can be found in the Lagoon Discharge PAR, attached.



Ontario Clean Water Agency
5 Industrial Dr.
Chesterville ON K0C 1H0
Phone: 613-448-3098
Fax: 613-448-1616

If you have any questions or concerns, please do not hesitate to contact me at (613) 448-3098.

Sincerely,

A handwritten signature in blue ink that reads "Dawn Crump".

Dawn Crump
Process & Compliance Technician
Seaway Valley Cluster

Cc: Marc Chenier, CAO/Clerk, Township of North Stormont
Stephane Barbarie, Senior Operations Manager, OCWA

**ONTARIO CLEAN WATER AGENCY
LAGOON PERFORMANCE ASSESSMENT REPORT**

MUNICIPALITY: TOWNSHIP OF NORTH STORMONT
 PROJECT: MOOSE CREEK LAGOON SYSTEM
 PROJECT #: 6990
 DESCRIPTION: TWO CELL FACULTATIVE AERATED LAGOON SYSTEM WITH ONE SEWAGE PUMPING STATION AND CONTINUOUS ALUM FEED SYSTEM FOR PHOSPHORUS REMOVAL

YEAR: 2018
 WATER COURSE: SOUTH NATION RIVER
 DESIGN CAPACITY: 302 m³/day

GRAB SAMPLE	91,320 m ³							
	SAMPLE DATE	23-Apr	25-Apr	28-Apr	30-Apr	Average	C OF A OBJECTIVE	C OF A LIMIT
START, END, AND EVERY 0.5 M OF DRAWDOWN DURING DISCHARGE	CBOD	10	12	20	14	14.0	15.0	30
	TSS	29	22	48	25	31.0	20.0	30
	TP	0.43	0.51	0.54	0.55	0.51	0.5	0.7
	NH ₃ + NH ₄	5.12	4.43	5.7	5.3	5.2	N/A	15
	H ₂ S	<0.02	0.03	<0.02	<0.05	0.019	ABSENT	0.17
	TKN	13.4	12.6	14.4	14.3			
	Nitrite	<0.10	<0.10	<0.10	<0.10			
	Nitrate	<0.10	<0.10	0.14	0.18			
AT LAGOON EFFLUENT DISCHARGE OUTFALL STRUCTURE	pH (on site)	8.3	8.46	8	8.35			
	Conductivity (on site)	700	600	620	660			
	Temp (on site)	7.1	8.5	8.8	10			
	<i>E. coli</i>	330	<10	<10	1820			
	un-ionized NH ₃ (calc)**	0.09	0.11	0.17	0.13			
	undissociated H ₂ S**	ND	0.0015	ND	ND			

UPSTREAM RESULTS				
SAMPLE DATE	23-Apr	25-Apr	28-Apr	30-Apr
CBOD	1	1	1	<1
TSS	4	4	4	33
TP	0.05	0.08	0.08	0.11
NH ₃ + NH ₄	<0.05	0.14	<0.05	0.14
H ₂ S	<0.01	<0.01	0.01	0.03
TKN	1.2	1	1.2	1.5
Nitrite	<0.10	<0.10	<0.10	<0.10
Nitrate	1.99	2.01	2.88	3.19
pH	8	8.07	8.30	8.25
Conductivity	950	810.0	940	980
Temp (on site)	6.4	7.1	7.9	7.7
<i>E. coli</i>	10	<10	<10	40

DOWNSTREAM RESULTS				
SAMPLE DATE	23-Apr	25-Apr	28-Apr	30-Apr
CBOD	1	5	5	3
TSS	4	25	31	19
TP	0.05	0.22	0.19	0.16
NH ₃ + NH ₄	0.06	1.51	2.32	0.85
H ₂ S	<0.02	<0.01	<0.01	<0.01
TKN	0.9	4.6	4.4	3.3
Nitrite	<0.10	<0.10	<0.10	<0.10
Nitrate	1.96	1.92	2	2.34
pH	8.1	8.23	8.30	8.20
Conductivity	950	720	880	890
Temp (on site)	6.0	6.9	7.8	7.7
<i>E. coli</i>	<10	10	<10	560

CBOD/SS/TP exceed when the seasonal average exceeds criteria
 NH₃/NH₄ & H₂S exceed when single sample result exceed
 **Undissociated H₂S, unionized NH₃, based on in-house calculations

	AVG. LOADING	C OF A LIMIT
CBOD (kg/d)	159.8	331
TSS (kg/d)	353.9	331
TP (kg/d)	5.8	7.7
NH ₃ + NH ₄ (kg/d)	58.8	166
H ₂ S (kg/d)	ND	1.9

CELL CONTENTS/ PRE DISCHARGE SAMPLES	SAMPLE DATE	West	East
		10-Apr-18	
	CBOD (mg/L)	34	4
	TSS (mg/L)	19	17
	TP (mg/L)	0.88	0.61
	NH ₃ + NH ₄ (mg/L)	6.16	7.43
	TKN (mg/L)	12.1	11.9
	S2-	0.02	<0.01
<i>E. coli</i>	940	850	

DISCHARGE FLOW (m ³ /d)	23-Apr	24-Apr	25-Apr	26-Apr	27-Apr	28-Apr	29-Apr	30-Apr
	9,730	11,249	11,622	11,175	11,886	11,886	11,886	11,886

Daily Loading	23-Apr	24-Apr	25-Apr	26-Apr	27-Apr	28-Apr	29-Apr	30-Apr	Average
BOD (kg)	97.3	135.0	139.5	223.5	237.7	237.7	166.4	166.4	175.4
TSS (kg)	282.2	247.5	255.7	536.4	570.5	570.5	297.2	297.2	382.1
TP (kg)	4.2	5.7	5.9	6.0	6.4	6.4	6.5	6.5	6.0
NH ₃ (kg)	49.8	49.8	51.5	63.9	68.0	68.0	63.5	63.5	59.7
H ₂ S (kg)	ND	0.34	0.35	ND	ND	ND	ND	ND	N/A