



Temagami North Wastewater Treatment Lagoon



Annual Performance Report

January 1, 2015 to December 31, 2015

Prepared by Ontario Clean Water Agency

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Annual Sewage Performance Report

Sewage System Name	Temagami North Wastewater Treatment Lagoon
Sewage System Address	37 Cedar Avenue, Village of Temagami North
Sewage System Owner	Corporation of the Municipality of Temagami
Sewage System Number	120000783
Environmental Compliance Approval No.	9498-9V7J5Y, issued May 25, 2015
Reporting Period	January 1, 2015 to December 31, 2015

Facility Description

Capacity of Works	390 m ³ /day average, 1200 m ³ /day peak
Service Area	Temagami, District of Nipissing
Service Population	450
Effluent Receiver	Net Lake
Major Process	Two Cell Aerated Lagoon

The Temagami North wastewater treatment system is classified as a Class I facility with a rated capacity of 390 m³/day and a peak flow rate of 1200 m³/day. Sewage from the mobile trailer park collects in a lift station which discharges to the main sewer line. Sewage from this line, and other homes in the area, collect at the pump station adjacent to the water treatment plant. This sewage pump station directs all sewage from the community to the treatment lagoon.

The treatment lagoon consists of two cells with a combined holding capacity of 4105 m³. Each cell has an area that is aerated by blowers; the blowers are located inside a building at the site. Ferric Sulphate is added between Cell #1 and Cell #2 for pH stabilization. The lagoon continually discharges into Net Lake.

1.0 Monitoring Data

1.1 Monitoring Program as Outlined in the Environmental Compliance Approval

cBOD₅ = Five-day carbonaceous biochemical oxygen demand measured in an unfiltered sample
 TSS = Total Suspended Solids
 TP = Total Phosphorus
 TKN = Total Kjeldahl Nitrogen
 (NH₃ + NH₄) N = Nitrogen as Ammonium and Ammonia

1.1.1 Raw Sewage (Influent)

Parameter	Type of Sample	Minimum Frequency
cBOD ₅	24 hour composite	monthly
TSS	24 hour composite	monthly
TP	24 hour composite	monthly
TKN	24 hour composite	monthly

1.1.2 Final Effluent

Parameter	Type of Sample	Minimum Frequency
cBOD ₅	24 hour composite	monthly
TSS	24 hour composite	monthly
TP	24 hour composite	monthly
(NH ₃ ⁻ + NH ₄) N	24 hour composite	monthly
<i>E. coli</i>	grab	monthly
pH	grab	weekly

1.2 Data

1.2.1 Influent Flow

Month	Average Flow (m ³ /day)	Maximum Flow Rate (m ³ /day)
January	240	341
February	331	2340
March	235	268
April	750	1410
May	472	804
June	240	475
July	196	280
August	196	314
September	164	208
October	163	257
November	563	1527
December	240	341

1.2.2 Summary of Influent Flow

Annual	Flow (m ³ /day)	Rated Capacity (m ³ /day)	% Capacity	Exceedance
Average	323	390	83	No
Peak Rate	2340	1200	195	Yes

1.2.3 Raw Sewage (Influent)

Parameter	Average	Maximum
BOD ₅ (mg/L)	131.7	427
cBOD ₅ (mg/L)	269	510
TSS (mg/L)	309	2320
TP (mg/L)	2.27	10.6
TKN (mg/L)	48.6	105

1.2.4 Effluent

Parameter	Average	Maximum	Compliance Limit	Compliance Period
cBOD ₅ (mg/L)	4.4	9.6	30	annual average
TSS (mg/L)	<10.9	60	40	annual average
TP (mg/L)	0.24	0.75	N/A	N/A
(NH ₃ ⁻ + NH ₄) N (mg/L)	2.22	6.12	N/A	N/A
pH	7.68	9.77	6.0 to 9.5	N/A
<i>E. coli</i> (cfu/100 mL)*	<129	380	N/A	N/A

*cfu = colony forming units.

1.3 Sewage Treatment Program Success and Adequacy

The Performance Summary details results and efficiency of the lagoon performance demonstrating pollutant removal rates from raw sewage concentrations through to final effluent for cBOD₅, suspended solids and total phosphorus.

1.3.1 Performance Summary

Parameter	Influent	Effluent	% Removal
BOD ₅ /cBOD ₅ (mg/L)	200 _(BOD₅/cBOD₅)	4.4	97.8
TSS (mg/L)	309	<10.9	<96.5
TP (mg/L)	2.27	0.24	89.4

2.0 Interpretation of Monitoring and Analytical Data

The Temagami North Wastewater Lagoon exceeded its peak flow rate capacity for the reporting period but maintained compliance with the annual average daily flow into the sewage plant. The raw sewage (influent) flow is a measurement based on the total volume of sewer water taken each day. Table 1.2.1 Influent Flow Data summarizes the flow data for 2015. The average flows and the maximum daily flows are presented for

each month. Compliance is achieved when the average for the year does not exceed 390 m³/day. The average daily flow for 2015 was 323 m³/day; representing 83 % of the capacity. The peak flow rate was 2340 m³/day, exceeding the rated capacity by 195 %. All flow rates were reported to the MOE via fax on a monthly basis.

The effluent quality is based on the carbonaceous biochemical oxygen demand, total suspended solids, and pH levels. The annual averages for all parameters are listed in table 1.2.4 *Effluent*.

Carbonaceous Biological Oxygen Demand (cBOD₅) represents the oxygen demand from organic compounds and the oxidation of inorganic compounds such as ferrous iron and sulphide. High cBOD₅ in effluent means a large quantity of oxygen was needed to break down the organic and inorganic matter in the effluent indicating inadequate treatment. In 2015, the average cBOD₅ complied with the limit of 30 mg/L.

Total suspended Solids (TSS) in effluent are composed of settleable and nonsettleable solids depending on the size, shape and weight of the solid particles. Settable solids are large sized particles that tend to settle more rapidly in a given period of time. In 2015, the average TSS complied with the limit of 40 mg/L.

The pH of a solution is an indication of its acidic and basic properties and measured on a scale ranging between 0 and 14. Very high or very low pH levels can be corrosive to pipes, screening equipment and pumps, can damage biological processes and form undesirable toxic gases or heavy metals. In 2015, the average pH was within the compliance range of 6-9.5. On one occasion in August the pH reached 9.77 but this decreased immediately once ferric was increased.

Refer to Appendix A for the Monthly Process Data Report, which summarizes the monitoring and sampling analysis conducted at the facility.

3.0 Effluent Quality Assurance and Control Measures Undertaken

The mechanical elements in the facility are in good repair, and each member of the operational staff possesses a high level of process knowledge and regulatory competence.

Samples are collected as required and analyzed by Accuracy Environmental Laboratories located in Kirkland Lake, Ontario. Licensed Operators conduct in-house tests for monitoring purposes using procedures as per Standard Methods of Water and Wastewater.

Any bypass or upset events that occur are tested, monitored and reported to the Spills Action Center (SAC).

4.0 Maintenance Procedures Performed on the Works

Routine maintenance was conducted as per OCWA's Hansen Preventative Maintenance software program. Major maintenance and upgrades that took place during 2015 includes the following:

- Lifting devices inspected
- Pumping stations cleaned out, including grit channels and bar screens

5.0 Environmental and Operating Problems and Corrective Actions

The Temagami North Lagoon system is not operating within its required capacity. For several years, inflow rates have been consistently at or near the design capacity. The high flow rates indicate that a major portion of the measured flow is a result of infiltration of storm water and annual snowmelt. The Municipality of Temagami has been working towards addressing these flow issues.

- Temagami North Lagoon exceeded the maximum daily flow limit of 1,200 m³ in February, April and November.
- Ferric continues to be added as required to the Temagami North Lagoon and the pH has remained within the compliance range except for one occasion in August when it reached 9.77. Ferric was increased and the pH dropped..
- Chain of Custody's were updated in July to reflect that BOD is required on the Raw sample instead of cBOD, as per the new ECA. The wrong chain of custody was used in October and cBOD was performed on the raw sample and BOD was performed on the Effluent sample instead of the other way around.

6.0 Efforts Made to Meet Effluent Objectives

The Temagami North Wastewater Treatment Lagoon was operated efficiently, producing quality treated wastewater that meets the Objectives specified in Condition 7 of the ECA. The mechanical elements in the facility are in good repair and the operational staff posses a high level of process knowledge and regulatory competence. Ferric was increased in August when the maximum pH occurred.

6.1 Effluent Objectives

Parameter	Average	Maximum	Objective	Exceedance
cBOD ₅ (mg/L)	4.4	9.6	25	No
TSS (mg/L)	<10.9	60	30	No
pH	7.68	9.77	6.5 to 8.5	Yes

7.0 Proposed Alterations, Extensions or Replacements to the Works

There are no proposed alterations, extensions or replacements planned for 2016.

8.0 Sludge Reporting

Not applicable for this facility.

9.0 Calibration and Maintenance of all Monitoring Equipment

Plant maintenance, including non-scheduled maintenance, is monitored using the Hansen Preventative Maintenance software program. All routine and preventative maintenance measures were conducted as scheduled in 2015.

All equipment is calibrated based on the manufactures recommendations. Refer to Table 8.1 for a summary of calibrations conducted in 2015.

9.1 Calibration Summary

Date	Instrument	% Accuracy
May 11	Flow Meter	99.1

Appendix A: Monthly Process Data Report

Raw Data (mg/L)	Count	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
BOD5	4								427	63		16.6	20	131.7
cBOD	8	69	33	137	352	510	404	393			257			269
Suspended Solids	12	40	30	86.7	325	2320	367	210	160	70	40	35.3	24	309
TKN	12	9.8	10.3	29.3	63.6	76.2	82.0	105.0	104.0	11.9	71.9	10.3	8.9	48.6
Total Phosphorus	12	0.565	1.02	1.58	3.12	10.6	2.11	2.13	2.26	1.47	1.31	0.45	0.61	2.27

The requirement to sample for cBOD was changed to BOD in the new ECA

Final Effluent (mg/L)	Count	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
cBOD5	12	7.2	3.2	4.1	5.1	5.2	2.6	9.6	4.2	3.4	3	3.1	2.3	4.4
Suspended Solids	13	9.5	5	<2	3	8	5	21.3	11.5	6.5	32.5	4	1	<10.9
Total Phosphorus	13	0.39	0.38	0.37	0.41	0.17	0.13	0.17	0.12	0.07	0.4	0.06	0.06	0.24
NH3 + NH4 as N	13	2.37	3.99	6.12	5.99	0.46	0.64	0.56	0.16	0.15	2.18	1.74	2.32	2.22
E. Coli. (cfu/100 mL)	12	200	380	800	105	<5	5	5	5	<5	5	20	15	<129
pH	52	7.38	7.23	7.20	8.12	7.42	7.32	8.83	8.44	7.41	7.73	7.72	7.44	7.68