

2020 Year End Report: Port Carling Clean Water Plant (CWP)



Environmental Compliance Approval: # 4174-AG8T75

Engineering and Public Works Department

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Introduction

The Port Carling Clean Water Plant (CWP), which services the community of Port Carling, is owned and operated by the District Municipality of Muskoka. The plant is located at 140 Medora Street, Port Carling, and was commissioned in 2015. It currently services 378 customers.

The Plant operates under the MOE Certificate of Approval (Sewage) #4174-AG8T75 issued February 18, 2009 and MOE Certificate of Approval (Air) #0571-67WJB7 December 1 2016. Under the terms of the Certificate of Approval, the plant is permitted to treat an average daily flow of 926 m³/day, and a peak flow of 3800 m³/day. Additionally, effluent limit criteria are as follows:

Table 1 Effluent Limit Criteria

Effluent Parameter	Concentration
CBOD	10 mg/L
Total Suspended Solids	10 mg/L
Total Phosphorous	0.30 mg/L
Total Ammonia Nitrogen Summer (May 15 to September 30)	1.10 mg/L
Total Ammonia Nitrogen Winter (October 01 to May 14)	5.40 mg/L
E. coli	80 CFU/100mL
pH	6.0-9.0 inclusive at all times

The facility process consists of grit removal and screening facilities, an activated sludge based secondary treatment process using membrane filters for solids separation, followed by disinfection with ultraviolet radiation. Chemical addition includes an alkalinity adjustment feed system, a sodium hypochlorite and citric acid system for membrane cleaning and a coagulant system using poly-aluminum chloride for phosphorous removal.

Treated effluent from the plant is discharged through a 300 mm effluent outfall line and is discharged to Indian River.

Waste sludge from the plant process is digested aerobically at the plant and periodically hauled off site for disposal.

All pumping stations and treatment control systems use SCADA (Supervisor Control and Data Acquisition), in combination with Data Highway Plus, and programmable logic controllers.

General Information

A review of the District of Muskoka infrastructure needs is conducted annually by the Director of Water and Sewer Services, Area Manager and Chief Operator, and recommendations for maintenance, rehabilitation and renewal programs are considered.

Efforts to eliminate the discharge of untreated or partially treated wastewater to receiving waters are being accomplished by a long term financial commitment to correct excessive infiltration into the wastewater collection system by means of sewer main rehabilitation / replacement, manhole rehabilitation and pumping station rehabilitation programs.

The treatment facility is capable of effective operation during emergencies; maintenance shut downs, and power failures. This is achieved through such measures as preventive maintenance of duty /

standby units, the duplication of major treatment components, the provision of standby power sources and extensive use of the SCADA systems. All pumping stations and treatment control systems use SCADA (Supervisor control and Data Acquisition), in combination with Data Highway Plus, and programmable logic controllers.

All operators are qualified to operate the systems efficiently and effectively in order to achieve the highest level of treatment at all times. A commitment to provide Operator training and certification is being sustained.

Regulatory sampling is carried out to meet the requirements outlined in the ECA, and additional in house operational sampling beyond these regulatory requirements is being performed on a routine basis. These efforts have resulted in an effective treatment process which ensures that effluent discharges consistently meet effluent objectives and are environmentally safe. All final effluent sample results for the MBR facilities met their effluent limits.

All data in this report is a compilation of test results received from SGS Canada and their accredited laboratory, Lakefield Research. All in-plant sampling, analysis and recording of results conforms, in order of precedence, to the following 3 standards: Ministry's Procedure F-10-1, "Procedures for Sampling and Analysis Requirements for Municipal and Private Sewage Treatment Works", Ministry's publication "Protocol for the Sampling and Analysis of Industrial/Municipal Wastewater" and the American Water Works Association/Water Environment Federation (AWWA/WEF) publication "Standard Methods for the Examination of Water and Wastewater".

Executive Summary

In all respects, test results of the treated effluent for the parameters of CBOD5, suspended solids, ammonia, total phosphorous, and E. Coli are in compliance with the limits outlined in the ECA regarding monthly allowable concentrations and total effluent loading throughout the entire 2020.

Overall, the plant treatment processes performed satisfactorily and are deemed to be adequate. All sample test results of the final effluent were within levels outlined in the plant ECA (#4174-AG8T75).

Quantity of Flow Summary

The plant has a daily average flow design capacity of 926 m³/day. The actual average daily flow for the 2020 was 533m³/day, however, the 3year average is 534m³/day, which represents 58% of the plant capacity. None of the individual system components exceeded the design flow rating.

Plant Operational Upsets or Process Failures

There were no plant operational problems in 2020.

Summary of Maintenance

There were no significant plant upgrades on major infrastructure in 2020.

All equipment information at this plant is entered into a computer database. From this information, a scheduled preventive maintenance program has been established. The maintenance program includes (but not limited to):

- Monthly testing of emergency testing (under load) of the standby generators.
- Annual servicing of emergency standby generators.
- Annual replacement of U.V. bulbs.
- Annual calibration of flow metering devices.

- Annual cleaning of all sewage pumping stations.
- Marine inspection of effluent outfall and diffuser completed in 2017. (5-year cycle)

Evaluation of the Need for Improvement Works

The treatment facility is operating at a plant capacity of 58% and is in compliance with specified effluent parameter criteria. In addition, there has been no significant treatment process upsets and plant bypasses. As a result, there is no need for improvements to the existing works.

Evaluation Summary of Proposed Work Requiring Approval under OWRA

Since the treatment facility is operating satisfactorily there is no anticipated works requiring an ECA amendment for 2021.

Interpretation of Analytical Results

All sample results for Raw Sewage and Final Effluent are reported in this section. Other tables in this report include chemical usage, biosolids quality, and biosolids quantity.

Raw Sewage

The information reported in the Raw Sewage sample results summary table consists of test results of analysis conducted on composite samples of the plant influent flow as required by the plant ECA. Samples are sent for analysis to Lakefield Research, as well as analysis conducted on site using Standard Methods or equivalent. Weekly analysis has been performed and reported as specified under the terms outline in the ECA.

Influent Analysis

Table 2 Influent Analysis

Influent Parameter	Minimum	4 Week Average Maximum	Annual Average	Average loading kg/day
BOD5 (mg/L)	22	294	112.6	55.49
Suspended Solids (mg/L)	17	347.5	163.2	80.62
Total Phosphorus (mg/L)	0.44	3.05	1.67	0.84
Ammonia (mg/L)	2.9	17.45	10.57	5.33
pH	6.6	7.86	7.37	N/A

Effluent Analysis

The information reported in the Final Effluent sample results summary table 3 consists of test results of analysis conducted on final effluent composite samples. Bacteriological samples, however, consisted of grab samples. Weekly analysis has been performed and reported as specified under the terms outlined in the ECA.

Effluent Objective Analysis

The effluent objectives were met during all sample periods.

Final Effluent Analysis Summary

All final effluent samples tested for CBOD5, suspended solids, ammonia, E. Coli, and total phosphorous were below non-compliance limits outlined in the ECA.

Table 3 Final Effluent Analysis Summary

Parameter	Minimum	4 Week Average Maximum	Annual Average	Average Loading kg/day
COBD5 (mg/L)	2	2.75	3	1.11
Suspended Solids (mg/L)	2	2.75	2.6	1.10
Total Phosphorus (mg/L)	0.03	0.03	0.03	0.02
Ammonia (mg/L)	0.10	0.175	0.17	0.06
E. Coli (#/100 mL)	0	0.75	0.06	N/A
pH	7.29	8.2	7.92	N/A

Average daily flow comparisons by day of week ensure ECA requirements for scheduled sampling are taken at a time, and in a location characteristic of the quality and quantity of the sewage stream over the time period being monitored. Average daily flow rates by day of the week compare the flow to the average daily flow for the entire year. This data is used to determine if a particular day of the week is best to ensure samples are taken to meet the requirements of scheduled monitoring sections of the ECA's. Sampling plans are reviewed and updated yearly based on the previous yearly flow data.

Final Effluent Sampling Summary

All samples were collected following the frequency and methods required by the facility approval. For the coming year, 2021, no changes to the sampling plan are being considered at this time.

Biosolids Generation

The quality and volume of biosolids hauled from the facility for disposal is outlined in the table provided. Dewatered biosolids from the plant was hauled to an approved landfill site. Private contractors were used by the District of Muskoka to transfer all material for disposal in 2020, and will continue to do so in 2021. It is not anticipated that there will be a significant increase in the total volume of bio solids produced in 2021.

Summary of Complaints received throughout the reporting period

There were no complaints received in the reporting period.

Port Carling Wastewater Collection Summary

New Sewer Services:

A total of four (4) customers connected to existing sewer laterals in 2020.

New Sewer Mains:

A total of one (1) new sewer main was installed in 2020.

Sewer Main Replacements:

No sewer main replacement occurred in 2020.

Low Pressure Sewer Breaks:

There were no low pressure sewer breaks in 2020.

Sewer Force Main Breaks:

There were no sewer forcemain breaks in 2020.

Sewer Force Main Replacement

No sewer forcemain replacement occurred in 2020

Main Line Sewer Blockage

There was one (1) sewer main blockage in 2020.

Sewer Lateral Blockage

There were no sewer lateral blockages in 2020.

Service Low Pressure Sewer Blockages:

There were no low pressure sewer blockages in 2020.

Frozen Sewer Force Mains:

No frozen force main in 2020.

Frozen Sewer Service Laterals:

No sewer service laterals froze in 2020.

Frozen Low Pressure Sewer Services:

No low pressure sewer services froze in 2020.

Sewer Flushing/Video:

Approximately 2,186 meters of sewer main was flushed and video inspected in 2020.

Sewer Locates:

Field staff addressed 203 written locate requests in 2020.

Table 4 Effluent Flow Summary - 2020

Month	Plant Total Monthly (m ³)	Average Day Flow (m ³ /d)	Maximum Day Flow (m ³ /d)	Minimum Day Flow (m ³ /d)	Lagoons Monthly Flow (m ³)	Facility Total Monthly Flow (m ³)
January	15,575	502	878	381	0	15,575
February	10,727	369	536	310	0	10,727
March	26,741	863	1,624	317	0	26,741
April	21,535	718	1,233	511	0	21,535
May	17,224	556	746	463	0	17,224
June	14,215	474	584	410	0	14,215
July	14,918	481	642	412	0	14,918
August	15,995	516	650	430	0	15,995
September	14,334	477	723	359	0	14,334
October	12,925	416	577	334	0	12,925
November	13,022	434	657	320	0	13,022
December	17,468	564	921	445	0	17,468

Total Flow: 194,679m³
 Average Day: 533m³
 Maximum Day: 1624m³
 Minimum Day: 310m³

Table 5 Influent Quarterly Analysis Summary – Weekly 24 Hour Composite Sample

Sample Date	Sample Identification Number	BOD5 mg/L	Total Kjeldahl Nitrogen mg/L	Nitrate Nitrogen mg/L	Nitrite Nitrogen mg/L	Total Ammonia Nitrogen mg/L	Total Phosphorus mg/L	Suspended Solids mg/L
Feb-3-20	CA13054	71	11.2	0.15	0.07	7.8	1.02	77
May-4-20	CA12109	206	28.3	<0.06	<0.03	15	3.6	192
Aug-04-20	CA12024	60	11.5	<0.06	<0.03	9.6	1.05	91
Nov-02-20	CA13098	140	12.1	<0.06	<0.03	9.2	1.16	140
Yearly Average		119.3	15.8	0.1	0.0	10.4	1.7	125.0
Maximum		206.0	28.3	0.2	0.1	15.0	3.6	192.0
Minimum		60.0	11.2	<0.06	<0.03	7.8	1.0	77.0

Table 6 Chemical Usage Summary: Alum

Month	Average Dosage mg/L	Total kg (dry)
January	41.5	519.5
February	42.2	363.3
March	42.2	931.2
April	42.2	758.6
May	42.2	602.6
June	42.2	518.7
July	42.2	542.4
August	42.2	564.3
September	42.2	512.8
October	42.2	466.3
November	42.2	457.0
December	42.2	600.9
Average	42.2	569.8

Total Yearly Kilograms: 6,838

Table 7 Chemical Usage Summary: Sodium Hydroxide

Month	Average Dosage mg/L	Total kg (dry)
January	76.2	735.6
February	99.6	666.0
March	72.5	1,101.3
April	69.8	971.5
May	62.1	695.8
June	66.2	637.0
July	72.2	730.1
August	106.3	931.8
September	83.3	790.2
October	66.1	574.7
November	72.9	610.2
December	60.7	673.5
Average	75.7	759.8

Total Yearly Kilograms: 9,118

Table 8 Effluent Quarterly Analysis Summary – Weekly 24 Hour Composite Sample Part 1

Sample Date	Sample Identification Number	CBOD5 mg/L	pH	Total Phosphorus mg/L	Suspended Solids mg/L
Feb-3-20	CA13054	<2	8.06	<0.03	<2
May-4-20	CA12109	<2	7.82	<0.03	<2
Aug-04-20	CA12024	<2	7.51	<0.03	<2
Nov-02-20	CA13098	<2	8.09	<0.03	<2
Yearly Average		<2	7.87	<0.03	<2
Maximum		<2	8.09	<0.03	<2
Minimum		<2	7.51	<0.03	<2

Table 9 Effluent Quarterly Analysis Summary – Weekly 24 Hour Composite Sample Part 2

Sample Date	Sample Identification Number	Total Kjeldahl Nitrogen mg/L	Nitrate Nitrogen mg/L	Nitrite Nitrogen mg/L	Total Ammonia Nitrogen mg/L
Feb-3-20	CA13054	<0.5	11.3	<0.03	<0.1
May-4-20	CA12109	<0.5	6.4	<0.03	<0.1
Aug-04-20	CA12024	<0.5	0.69	<0.03	<0.1
Nov-02-20	CA13098	0.9	4	<0.03	<0.1
Yearly Average		0.0	5.6	<0.03	<0.1
Maximum		0.9	11.3	<0.03	<0.1
Minimum		<0.5	0.7	<0.03	<0.1

Table 11 Effluent Loading and Concentration Summary 2020: COBD5

Month	Average mg/L	Average kg/day	Maximum Daily kg/day
January	2.00	1.00	1.76
February	2.25	0.83	1.21
March	2.20	1.90	3.57
April	2.00	1.44	2.47
May	2.00	1.11	1.49
June	2.00	0.95	1.17
July	2.00	0.96	1.28
August	2.60	1.34	1.69
September	2.00	0.95	1.45
October	2.00	0.83	1.15
November	2.00	0.87	1.32
December	2.00	1.13	1.84
Average Monthly	2.09	1.11	1.70
Effluent Objective	5.00		4.63
Non-Compliance	10.00		9.26

Table 12 Effluent Loading and Concentration Summary 2020: Suspended Solids

Month	Average mg/L	Average kg/day	Maximum Daily kg/day
January	2.00	1.00	1.76
February	2.00	0.74	1.07
March	2.00	1.73	3.25
April	2.00	1.44	2.47
May	2.00	1.11	1.49
June	2.40	1.14	1.40
July	2.00	0.96	1.28
August	2.00	1.03	1.30
September	2.00	0.95	1.45
October	2.00	0.83	1.15
November	2.60	1.13	1.71
December	2.00	1.13	1.84
Average Monthly	2.08	1.10	1.68
Effluent Objective	5.00		4.63
Non-Compliance	10.00		9.26

Table 13 Effluent Loading and Concentration Summary 2020: Total Ammonia Nitrogen Summer

Month	Average mg/L	Average kg/day	Maximum Daily kg/day
May	0.15	0.08	0.11
June	0.12	0.06	0.07
July	0.10	0.05	0.06
August	0.10	0.05	0.07
September	0.10	0.05	0.07
Average Monthly	0.11	0.06	0.07
Effluent Objective	0.80		0.74
Non-Compliance	1.10		1.02

Table 14 Effluent Loading and Concentration Summary 2020: Total Ammonia Nitrogen Winter

Month	Average mg/L	Average kg/day	Maximum Daily kg/day
January	0.10	0.05	0.09
February	0.10	0.04	0.05
March	0.10	0.09	0.16
April	0.10	0.07	0.12
October	0.10	0.04	0.06
November	0.10	0.04	0.07
December	0.10	0.06	0.09
Average Monthly	0.10	0.06	0.10
Effluent Objective	4.00		3.70
Non-Compliance	5.40		5.00

Table 15 Effluent Loading and Concentration Summary 2020: Fecal Coliform

Month	Geomean (#/100mL)	Maximum Daily (#/100mL)
January	0.00	0.00
February	0.00	0.00
March	0.00	0.00
April	0.00	0.00
May	0.00	0.00
June	0.00	0.00
July	0.75	0.00
August	0.00	0.00
September	0.00	0.00
October	0.00	0.00
November	0.00	0.00
December	0.00	0.00
Average Monthly	0.06	0.00
Effluent Objective	2.20	
Non-Compliance	80.00	

Table 16 Effluent Loading and Concentration Summary 2020: Total Phosphorus

Month	Average mg/L	Average kg/day	Maximum Daily kg/day
January	0.03	0.02	0.03
February	0.03	0.01	0.02
March	0.03	0.03	0.05
April	0.03	0.02	0.04
May	0.03	0.02	0.02
June	0.03	0.01	0.02
July	0.03	0.01	0.02
August	0.03	0.02	0.02
September	0.03	0.01	0.02
October	0.03	0.01	0.02
November	0.03	0.01	0.02
December	0.03	0.02	0.03
Average Monthly	0.03	0.02	0.02
Effluent Objective	0.10		0.09
Non-Compliance	0.30		0.28

Table 17 Liquid Sludge Production Summary 2020

Month	Hauler	Liquid Volume m ³	Cake Weight kg	Destination
January				
February				
March				
April	ROHES	424.0		ROHES
May				
June	ROHES	445.0		ROHES
July	ROHES	450.0		ROHES
August				
September				
October	ROHES	536.0		ROHES
November				
December				

Yearly Total Volume: 1,855m³
 Yearly Average Volume: 464m³
 Maximum Volume: 536m³
 Minimum Volume: 424m³

Table 19 Sludge Quality Analysis 2020

Parameter Sampled (mg/L)	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
Date	Feb-3-20	May-04-20	Aug-04-20	Nov-02-20
Sample ID	CA12285	CA12110	CA12025	CA13099
Nitrate	34	8.6	1.3	1.7
Mercury	0.007	0.002	0.003	0.003
Chromium	0.23	0.14	0.17	0.16
Cobalt	0.03	0.02	0.02	0.01
Copper	8.2	3.1	5.1	4.6
Lead	0.3	0.1	0.2	0.2
Molybdenum	0.06	<0.05	<0.05	<0.05
Nickel	0.16	0.09	0.12	0.08
Selenium	<0.1	<0.1	<0.1	<0.1
Arsenic	<0.1	<0.1	<0.1	<0.1
Zinc	9	4	7.0	5
Cadmium	0.016	0.006	0.011	0.01
Ammonia+ Ammonium	<1	<1	0.1	2.3
Total Kjeldahl Nitrogen	380	276	513	186
Total Phosphorus	250	130	150	120
Total Solids	9800	7480	9770	8160
Volitile Solids				
Nitrite	1.1	0.5	0.5	0.9
Potassium	35	24	33	29
Total Suspended Solids				

Certification of Reports

I certify that the information in this document and all attachments are correct, accurate, and complete to the best of my knowledge

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