

## Lone Pine Road (Port Severn) Water Pollution Control Plant



2018

Wastewater, Year End Report

Environmental Compliance Approval: #3-0429-96-006

## Introduction

The Lone Pine Road (WPCP), which services the Town of Port Severn, is owned and operated by the District Municipality of Muskoka. The plant is located at 115 Lone Pine Road, and was commissioned in October, 1997. It currently services 209 customers.

The water pollution control plant operates under MOE Environmental Compliance Approval (ECA) #3-0429-96-006 (Sewage), Certificate # 8-6071-96-976 (Air). Under the terms of the ECA, the average daily design flow rate for the plant is 700 cubic meters (m<sup>3</sup>) per day and the maximum design flow rate is 2,230 cubic meters (m<sup>3</sup>) per day.

The treatment plant began treating sewage from the Port Severn wastewater collection system on October 1997. The collection system includes three remote sewage lift stations and an influent pumping station. Located at the treatment plant site are 2 ICEAS Sequencing Batch Reactors, each with a rated design capacity of 1,115 m<sup>3</sup>/day, giving a total peak design flow rate of 2,230 m<sup>3</sup>/day. Additionally, effluent limit criteria are as follows:

Effluent Parameter	Concentration	Total Effluent Loading
CBOD5	15 mg/l	10.5 kg/day
Suspended Solids	15 mg/l	10.5 kg/day
Ammonia/Ammonia Nitrogen	2.5 mg/l (May-October)	1.75 kg/day
	15 mg/l (November-April)	2.7 kg/day
Total Phosphorous	0.30 mg/l	0.21 kg/day (or 100 kg/year)
pH	5.5 – 9.5 inclusive at all times	

The treatment process is comprised of 2 sequencing batch reactors, phosphorous precipitation using aluminum sulphate, deep sand effluent filtration, and ultraviolet disinfection. Treated effluent from the plant is discharged through a FRP (Fiberglass Reinforced Plastic) diffuser, located downstream of Lock 45, in Severn Sound.

Waste sludge from the plant process is digested aerobically at the plant, and is 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's 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 samples were taken as required by the ECA.

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 Certificate of Approval regarding monthly allowable concentrations and total effluent loading throughout the entire year.

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 (#3-0429-96-006).

## **Quantity of Flow Summary**

The plant has a daily average flow design capacity of 700 m<sup>3</sup>/day. The actual average daily flow for the year was 203 m<sup>3</sup>/day, however, the 3-year average is 203 m<sup>3</sup>/day, which represents 29% of the plant capacity.

## **Plant Operational Upsets or Process Failures**

There were no plant operational problems in 2018.

## Summary of Maintenance

There were no significant plant upgrades on major infrastructure in 2018.

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

- Monthly testing of emergency testing (under load) of the standby generators.
- Monthly calibration verification of analytical equipment.
- 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)

All flow meter and analytical calibration verifications indicated all equipment was within calibration tolerances as required the ECA.

## Evaluation of the Need for Improvement Works

The treatment facility is operating at a plant capacity of 29% 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.

## Summary of Proposed Work Requiring Approval under OWRA

Although the treatment facility is operating satisfactorily there are anticipated upgrades to various components of the plant, possible requiring an ECA amendment in 2019. These upgrades are to existing equipment as part as normal lifecycle replacement. These upgrades are expect to be made to the tertiary filters and chemical feed equipment.

## 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.

### ***Effluent analysis***

The information reported in the Final Effluent sample results summary table #7 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.

### ***Final Effluent Analysis Summary***

	<b>Minimum</b>	<b>4 Week Average Maximum</b>	<b>Annual Average</b>	<b>Average Loading kg/day</b>
CBOD5 (mg/l)	2.0	2.75	2.1	0.43
Suspended Solids (mg/l)	2.0	2.25	2.04	0.41
Total Phosphorous (mg/l)	0.03	0.07	0.05	0.01
Ammonia (mg/l)	0.10	0.58	0.18	0.04
E. Coli (#/100 ml)	0	4.25	<1	Not Applicable
pH	Min – 6.52	Max – 7.51	6.90	Not Applicable

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

### ***Biosolids Generation***

The quality of biosolids is provided in the attached table and the volume of biosolids hauled from the facility for disposal is provided as well. Liquid biosolids from the plant were hauled to the Region of Huronia Environmental Services storage facilities for further treatment. Private contractors were used by the District of Muskoka to transfer all material in 2018, and will continue to do so in 2019 as well.

It is not anticipated that there will be a significant increase in the total volume of biosolids produced in 2019.

### ***Complaints***

No complaints were received in 2018.

## **Wastewater Collection Summary**

### **New Sewer Services**

A total of 31 customers connected to existing sewer laterals in 2018, 8 of which were installed in 2018.

### **New Sewer Mains**

There were new sewer mains to report in 2018.

### **Sewer Main Replacements**

There were no sewer mains replaced in 2018.

### **Low Pressure Sewer Breaks**

There were no low pressure sewer breaks in 2018.

### **Sewer Force Main Breaks**

There were no sewer force main breaks in 2018.

### **Sewer Force Main Valve Replacement**

There were no sewer force main valve replacements in 2018.

### **Main Line Sewer Blockage**

There were no main line sewer blockages in 2018.

### **Sewer Lateral Blockage**

There were no sewer lateral blockages in 2018.

### **Low Pressure Sewer Blockages**

No low pressure sewer blockages in 2018.

### **Frozen Sewer Force Mains**

No sewer force mains froze in 2018.

### **Frozen Sewer Service Laterals**

No sewer service laterals froze in 2018.

### **Frozen Low Pressure Sewer Services**

No low pressure sewer services froze in 2018.

### **Air Release Valves**

All sewer Air-Vacuum Release Valves were inspected once in 2018.

### **Sewer Flushing/Video**

A total of 91 meters of sewer main was flushed in 2018.

A total of 758 meters of sewer main was video inspected in 2018.

### **Sewer Rehabilitation**

There was no sewer rehabilitation in 2018.

### **Sewer locates**

District staff addressed 69 locate requests in 2018.

## **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.

Marcus Firman, C.E.T.  
Director of Water and Wastewater Operations

Mike Mitchell  
Manager of Water and Wastewater Operations



### TABLE 1: EFFLUENT FLOW SUMMARY - 2018

District of Muskoka - Lone Pine Dr. WPCP - Port Severn

Month	Total Monthly (m <sup>3</sup> )	Average Day Flow (m <sup>3</sup> /d)	Maximum Day Flow (m <sup>3</sup> /d)	Minimum Day Flow (m <sup>3</sup> /d)	Comments
January	6,015	194	413	0	
February	5,054	181	476	0	
March	4,958	160	280	0	
April	7,694	256	488	0	
May	6,028	194	263	0	
June	6,424	214	345	0	
July	7,767	251	363	0	
August	7,622	246	294	0	
September	6,261	209	362	0	
October	5,871	189	294	0	
November	5,683	189	353	0	
December	4,898	158	275	0	

Total

Average Day

Maximum Day

Minimum Day

**TABLE 3: INFLUENT QUARTERLY ANALYSIS SUMMARY - 2018**

**District of Muskoka - Lone Pine Dr. WPCP - Port Severn**

Sample Date	Sample Identification Number	Weekly 24 Hour Composite Sample					
		BOD5 mg/L	Alkalinity (Total as CaCO3) mg/L	pH	Phosphate mg/L	Total Phosphorus mg/L	Suspended Solids mg/L
12-Feb-18	CA13390	144		7.33		2.33	112
14-May-18	CA12713	101		7.18		4.9	146
13-Aug-18	CA13288	166		7.18		4.46	41
12-Nov-18	CA12469	191		7.12		2.5	124
Yearly Average		150.5		7.20		3.5	105.8
Maximum		191.0		7.33		4.9	146.0
Minimum		101.0		7.12		2.3	41.0

Sample Date	Weekly 24 Hour Composite Sample					
	Conductivity mg/L	Total Kjeldahl Nitrogen mg/L	Nitrate Nitrogen mg/L	Nitrite Nitrogen mg/L	Total Ammonia Nitrogen mg/L	Chloride mg/L
12-Feb-18		24.2			20.8	
14-May-18		40.5			27.8	
13-Aug-18		46.1			43.4	
12-Nov-18		31.1			23.7	
Yearly Average		35.5			28.9	
Maximum		46.1			43.4	
Minimum		24.2			20.8	

**TABLE 4: CHEMICAL USAGE SUMMARY - 2018**

**District of Muskoka - Lone Pine Dr. WPCP - Port Severn**

Month	ALUM			SODA ASH			SODIUM HYPOCHLORITE			POLYMER		
	Average Dosage	Total kg	Estimated Monthly Cost	Average Dosage	Total kg	Estimated Monthly	Average Dosage	Total kg	Estimated Monthly	Average Dosage	Total kg	Estimated Monthly
January	106.4	748.1	\$254									
February	125.0	758.1	\$7,742									
March	127.5	730.2	\$248									
April	126.1	1,102.5	\$374									
May	122.2	843.2	\$286									
June	112.7	847.0	\$287									
July	120.3	1,035.1	\$351									
August	115.3	1,050.9	\$356									
September	115.3	855.7	\$290									
October	117.8	793.9	\$269									
November	118.7	738.9	\$250									
December	126.3	709.4	\$240									
Average Monthly	119.5	851.1	\$912	0.0	0.0	\$0	0	0.0	\$0	0.0	0	\$0
Unit Cost (see note 1)	\$339.00 per MT			per kg			per MT			per MT		
Total Yearly		10,213	\$10,947		0	\$0		0	\$0		0	\$0

TOTAL YEARLY COST OF CHEMICALS =	\$10,947
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**TABLE 6: EFFLUENT QUARTERLY ANALYSIS SUMMARY - 2018**

**District of Muskoka - Lone Pine Dr. WPCP - Port Severn**

Sample Date	Sample Identification Number	BOD5 mg/L	Alkalinity (Total as CaCO3) mg/L	pH	Phosphate mg/L	Total Phosphorus mg/L	Suspended Solids mg/L
12/Feb/18	CA13390	2		6.99		0.03	2
14-May-18	CA12713	2		7.50		0.05	2
13-Aug-18	CA13288	2		7.43		0.06	2
12-Nov-18	CA12469	2		7.75		0.09	2
Yearly Average		2.0		7.42		0.1	2.0
Maximum		2.0		7.75		0.1	2.0
Minimum		2.0		6.99		0.0	2.0

Sample Date	Conductivity mg/L	Total Kjeldahl Nitrogen mg/L	Nitrate Nitrogen mg/L	Nitrite Nitrogen mg/L	Total Ammonia Nitrogen mg/L	Chloride mg/L
12/Feb/18	977				0.5	
14-May-18	648				0.1	
13-Aug-18	711				0.1	
12-Nov-18	746				0.1	
Yearly Average	770.5				0.2	
Maximum	977.0				0.5	
Minimum	648.0				0.1	

**TABLE 7: EFFLUENT LOADING and CONCENTRATION SUMMARY - 2018**

District of Muskoka - Lone Pine Dr. WPCP - Port Severn

MONTH	BOD <sub>5</sub>			SUSPENDED SOLIDS			TOTAL AMMONIA NITROGEN						TKN			E. COLI		TOTAL PHOSPHOROUS						
	Average		Maximum Daily	Average		Maximum Daily	Summer (May to Oct)			Winter (Nov to Apr)			Average		Maximum Daily	Average	Maximum Daily	Average		Maximum Daily				
	mg/L	kg/d	kg/d	mg/L	kg/d	kg/d	mg/L	kg/d	kg/d	mg/L	kg/d	kg/d	mg/L	kg/d	kg/d	mg/L	kg/d	kg/d	#/100 mL	#/100 mL	mg/L	kg/d	kg/d	
January	2.00	0.39	0.83	2.00	0.39	0.83				0.58	0.11	0.02				0.60	2.00	0.05	0.01	0.02				
February	2.00	0.36	0.95	2.00	0.36	0.95				0.23	0.04	0.02				1.25	2.00	0.05	0.01	0.02				
March	2.75	0.44	0.77	2.25	0.36	0.63				0.10	0.02	0.01				0.00	0.00	0.05	0.01	0.01				
April	2.00	0.51	0.98	2.20	0.56	1.07				0.10	0.03	0.02				0.00	0.00	0.04	0.01	0.02				
May	2.50	0.49	0.66	2.00	0.39	0.53	0.10	0.02	0.03							0.25	1.00	0.04	0.01	0.01				
June	2.00	0.43	0.69	2.00	0.43	0.69	0.13	0.03	0.04							0.25	1.00	0.02	0.00	0.01				
July	2.00	0.50	0.73	2.00	0.50	0.73	0.10	0.03	0.04							2.20	10.00	0.06	0.02	0.02				
August	2.00	0.49	0.59	2.00	0.49	0.59	0.10	0.02	0.03							0.00	0.00	0.05	0.01	0.01				
September	2.00	0.42	0.72	2.00	0.42	0.72	0.13	0.03	0.05							4.25	17.00	0.07	0.01	0.03				
October	2.00	0.38	0.59	2.00	0.38	0.59	0.20	0.04	0.06							0.20	1.00	0.05	0.01	0.01				
November	2.00	0.38	0.71	2.00	0.38	0.71				0.20	0.04	0.07				1.00	3.00	0.05	0.01	0.018				
December	2.25	0.36	0.62	2.00	0.32	0.55				0.10	0.02	0.03				0.00	0.00	0.04	0.01	0.011				
Average Monthly																								
Average Yearly	2.14	0.43		2.04	0.41		0.13	0.03		0.22	0.04					0.80		0.05	0.01					
Effluent Objective	<10	7		<10	7		<1	0.7		4.00	0.7					80.00		<0.15	0.11					
Non-Compliance	15	10.5		15.00	10.5		2.5	1.75		15.00	2.7					80.00		0.30	0.21					

Note: Bracketed and Bolded Values indicate non-compliance ( )

**TABLE 9: LIQUID SLUDGE PRODUCTION SUMMARY - 2018**

**District of Muskoka - Lone Pine Dr. WPCP - Port Severn**

No.	Date	Hauler	Shipped To		Received From		Comments
			Location	Volume	Location	Volume	
1	JAN			0.00			
2	FEB			0.00			
3	MAR			0.00			
4	APR			0.00			
5	MAY	ROHES	ROHES LAGOONS	109.20			3 LOADS FROM 601
6	JUNE			0.00			
7	JULY			72.80			
8	AUG			0.00			
9	SEPT			0.00			
10	OCT			0.00			
11	NOV	ROHES	ROHES LAGOONS	218.40			3 LOADS 601 / 3 LOADS 602
12	DEC			0.00			
Yearly Total			400.4				
Cost @ \$28/m3			11,211				
Yearly Total Cost			11,211				

**TABLE 10: SLUDGE QUALITY ANALYSIS - 2018**

**District of Muskoka - Lone Pine Dr. WPCP - Port Severn**

Parameter Sampled Date	Quaterly Analysis				Average	Comments
	12-Feb-18	14-May-18	13-Aug-18	Nov-18		
Sample ID	CA13386	CA12691	CA13294	CA12468		
Nitrate mg/L	54	120	1.9	2	<b>44</b>	
Mercury mg/L	0.045	0.054	0.075	0.090	<b>0.066</b>	
Chromium mg/L	0.42	0.44	0.66	0.71	<b>0.56</b>	
Cobalt mg/L	0.02	0.03	0.05	0.05	<b>0.04</b>	
Copper mg/L	3.8	3.5	6.1	6.6	<b>5.0</b>	
Lead mg/L	0.1	0.1	0.1	0.20	<b>0.13</b>	
Molybdenum mg/L	0.12	0.07	0.12	0.12	<b>0.11</b>	
Nickel mg/L	0.25	0.27	0.39	0.43	<b>0.34</b>	
Selenium mg/L	0.1	0.1	0.1	0.1	<b>0.1</b>	
Arsenic mg/L	0.1	0.1	0.1	0.1	<b>0.1</b>	
Zinc mg/L	4.5	4.2	7.4	9	<b>6</b>	
Cadmium mg/L	0.007	0.007	0.014	0.016	<b>0.011</b>	
Ammonia mg/L	2.6	2	48.9	1	<b>13.6</b>	
Total Kjeldahl Nitrogen mg/L	594	666	774	724	<b>690</b>	
Total Phosphorus mg/L	400	410	650	750	<b>553</b>	
Total Solids mg/L	15400	22800	23800	25000	<b>21750</b>	
NO2 mg/L	0.3	0.3	1.7	2.2	<b>1.1</b>	
Chloride mg/L	97	110	90	94	<b>98</b>	
PO4(sol)(Dissolved Rea mg/L a	0.75	0.75	3.27	0.75	<b>1.38</b>	
TSS mg/L	13600	20700	20800	24500	<b>19900</b>	
BOD mg/L	578	2720	789	505	<b>1148</b>	
COD mg/L	10000	14600	14500	15200	<b>13575</b>	

