2021 Year End Report: Port Severn Potable Water Plant (PWP)

Drinking Water Works Permit: 143-202

Municipal Drinking Water License: 143-102

Ministry of Environment, Conservation and Parks Waterworks #: 220001669

Engineering and Public Works Department

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Introduction

The Port Severn Potable Water Plant (PWP) serving the community of Port Severn is owned and operated by the District Municipality of Muskoka

It constructed in 1997 and has an initial design capacity of 1,265 m^3/day. The water system currently serves 231 customer service connections

The plant operates under license 143-102 and permit 143-202, issued in September 2020 under the Municipal Drinking Water Licensing Program. The plant also presently operates under MECP permit to take water #2330-A4SPKK (expires December 31, 2025), which permits the operation of up to 1,900 meters cubed per day.

The Raw Water intake structure is located in the Severn River (Little Lake) approximately 4.5 meters deep and 250 meters from shore.

The plant process is a conventional Package filtration plant, with supplementary pH adjustment. The facility includes an intake crib, intake pipe, fixed screen, and a low lift pumping station. The treatment plant consists of two (2) self-contained Ecodyne Graver Monoplant water treatment units, consisting of a flocculation chamber, a tube settling chamber and an anthracite sand gravity filters. Also located at the treatment plant are one (1) contact chambers, two (2) clear wells, 5 (5) high lift pumps, chemical storage, preparation, and feed equipment.

The treatment plant system features chemical treatment consisting of Aluminum Sulfate (coagulation), sodium hydroxide (pH control) and disinfection in a chlorine contact chamber followed by final pH adjustment. The addition of hydrofluosilicic acid (fluoridation) to prevent tooth decay completes the treatment process.

All treatment control systems use a Supervisory Control and Data Acquisition (SCADA) system for process control and monitoring.

Legislation Requirements

Safe Drinking Water Act

In the Part Two Report of the Walkerton Inquiry, Commissioner Dennis O'Connor recommended that the Ontario Government enact a Safe Drinking Water Act to deal with matters related to treatment and distribution of drinking water. The Safe Drinking Water Act (SDWA) received royal assent in December, 2002.

The purpose of the Act is to gather in one place all legislation and regulations relating to the treatment and distribution of drinking water. The Act serves to protect human health through the control and regulation of drinking water systems and drinking water testing.

The foundation provisions of the Safe Drinking Water Act include:

- Purpose of the Act
- Definitions
- Minister's Powers and Duties
- Inspections

- Compliance and Enforcement
- Appeals and Offences

Ontario Regulations

The Ontario Government has enacted several supporting regulations under the SDWA (2002). These regulations combine previous requirements under the Ontario Water Resources Act and the new requirements under the SDWA. Key components of the regulations include:

- System Categories
- Groundwater Under Direct Influence Of Surface Water (GUDI)
- Exemptions
- Approval of Systems
- Treatment
- Testing and Operational Checks (General Rules)
- Operational Checks
- Microbiological Testing
- Chemical Testing
- Adverse Conditions
- Corrective Action
- Engineer's and Summary Reports

Municipal Drinking Water Licenses / Certificates of Approval

The Municipal Drinking Water Licensing Program has replaced the Certificate of Approval program for municipal residential drinking water systems. The Ontario Government has implemented the Municipal Drinking Water Licensing Program (MDWLP) as recommended by Justice O'Connor in the Part II Report of the Walkerton Inquiry. Justice O'Connor recommended a new approvals framework for municipal drinking water systems, which would require owners to obtain a license to operate their systems as well as incorporate the concept of quality management into their operations.

A municipal drinking water license is an approval that is issued by the MECP to owners under the Safe Drinking Water Act, 2002 for the operation of municipal residential drinking water systems. The District of Muskoka operated under various Certificates of Approval until October 2010 when the operating licenses were issued.

Previous Certificates of Approval were required for the establishment, replacement or alteration of all municipal drinking water systems. The MECP issued Certificates of Approval to ensure that all undertakings comply with the legislation (i.e. Acts and Regulations) and the Ministry's Environmental Guidelines and Procedures developed to provide consistency of approach to various aspects of environmental protection throughout the province. Municipal Drinking Water Licenses and Permits similar to previous Certificates of Approval provide specific details about the drinking water system including:

- Drinking Water System Description
- Definitions and Information
- General Information – Compliance, Other Legal Requirements, Adverse Effects, Inspections
- Performance – Rated Capacity, Management of Residue
- Monitoring and Recording – Flow Measuring Devices, Sampling
- Operations and Maintenance

Comparison to Rated Capacity and Flow Rates

The Port Severn Potable Water Plant has a rated capacity of 1,265 meters cubed per day. In 2021, the total monthly average flow for the year was 218 meters cubed per day. The maximum day flow for the year was 557 meters cubed per day however the 3-year average for maximum day flow is 575.1 meters cubed per day. This represents 46% of the plant design capacity. No problems have been associated with this flow.

Monthly flows are shown in the attached table.

The Permit to Take Water (PTTW #2330-A4SPKK) permits 1,900 meters cubed per day; therefore there were no exceedances of this permit.

Summary of Analytical Results

A total of 675 microbiological regulatory tests were performed in 2021 and compliance with Provincial standards was achieved throughout the entire year.

There were 156 free chlorine residual tests performed in the distribution system and all results were satisfactory. Staff continue to routinely sample all areas of the system to ensure adequate free chlorine residuals are available throughout the distribution system.

A summary of other analytical results is also shown in this report.

Summary of Treatment Chemicals

The following chemicals are used for the treatment of drinking water at the Port Severn PWP:

- Aluminum Sulfate: Coagulant
- Sodium Hypochlorite: Disinfection
- Sodium Hydroxide: pH Adjustment
- Hydrofluosilicic Acid - Fluoride

A table summarizing the chemical use and average dosages is included in this report.

Documentation of System Repairs and Upgrades

Follow-up of deficiencies from 2020 lifecycle replacements addressed.

External Audits

MOE Inspection

A MECP inspection was completed on September 28th, 2021. The overall rating was 100%.

DWQMS Audit

In 2021, all drinking water systems within the District had an external reaccreditation audit performed. There were no minor non-conformances reported and all drinking water systems have been recertified. Overall, all drinking water systems are performing satisfactorily.

Port Severn Water Distribution Summary 2021

New Services:

There were four (4) new water services installed in 2021.

Broken Watermains:

There were no broken water mains to report in 2021.

Service Leaks:

There were three (3) service leaks reported and repaired in 2021, none of which were located on the Municipal side.

Service Relocation:

There were no service relocations to report in 2021.

Frozen Services:

No municipal water services were frozen in 2021.

Replacement Watermains:

No watermain replacement occurred in 2021.

New Watermains:

There were three (3) new watermains installed in 2021.

190 meters of 250 mm PVC in Oak Bay Development on Marina Village, 156 meters of 100 mm PVC at Lock 45 Parks Canada, Port Severn Rd and 140 meters of 50 mm Poly pipe in Oak Bay Development, Marina Village.

Valve Replacement:

No mainline valve replacement took place in 2021.

Fire Hydrants:

There are 42 municipally assumed hydrants maintained by the District in Port Severn. Hydrants are pumped dry in the fall and scoped throughout winter months to ensure they are not susceptible to freezing. Three (3) of the 42 hydrants were installed in 2021.

Meter Installations:

A total of two (2) water meters were replaced in Port Severn in 2021 as part of the aged meter change out program. The average meter age in Port Severn is 15 years.

Service Box Activities:

District staff responded to seven (7) water turn on/off requests and no curb stop box repairs in 2021

Air-Vacuum Release Valves:

Six (6) air release valves were inspected and tested for proper operation in 2021. Each of the chambers was inspected and pumped out as required. WARV-06 was turned off at the control valve due to high water table in chamber.

Locates:

District operations completed 99 buried utility locate requests in 2021 as part of Ontario OneCall requirements.

Table 1 Water Flow Summary - 2021

Month	Total Monthly (m^3)	Average Day Flow (m^3/d)	Maximum Day Flow (m^3/d)	Minimum Day Flow (m^3/d)
January	2,545	82	112	67
February	2,821	101	182	85
March	2,735	88	171	65
April	2,886	96	221	69
May	7,319	236	347	127
June	10,227	341	554	226
July	10,605	342	415	219
August	12,933	417	557	348
September	9,361	312	396	251
October	8,558	276	341	225
November	4,748	158	237	144
December	5,220	168	216	149

Total Flow: 79,959
Average Day: 218.8
Maximum Day: 557
Minimum Day: 65.1

Table 2 Raw Water Monthly Analysis Summary 2021 Part 1

Month	Alkalinity (mg/L)	Hardness (mg/L)	pH	Turbidity (ntu)	True Colour (tcu)	Temperature (Celsius)
January	59.0	52.5	7.7	0.4	29.00	6.9
February	74	58.0	7.6	0.5	29.25	5.4
March	59.0	63.6	7.6	0.5	25.40	6.1
April	58.3	49.5	7.7	0.4	29.50	10.1
May	40.4	33.6	7.5	0.4	24.60	14.0
June	46.1	38.0	7.2	0.5	19.00	18.8
July	50.8	41.5	7.4	1.0	23.50	21.2
August	58.1	50.0	7.6	0.7	21.00	22.6
September	69.6	58.0	7.7	0.7	13.50	20.4
October	70.8	60.0	7.6	0.3	8.50	18.1
November	61.0	48.8	7.7	0.3	14.50	13.9
December	65.9	53.5	7.8	0.4	27.75	8.3
Average	59.4	50.6	7.6	0.5	22.1	13.8

Table 3 Raw Water Monthly Analysis Summary 2021 Part 2

Month	Microcystin (ug/L)	TDS (mg/L)	Langliers Saturation Index	Total Coliforms (CFU/100mL)	E. Coli (CFU/100mL)	Total Number of Samples
January	Not Sampled	101	-1.1	2.0	0.5	4
February	Not Sampled	134.2	-1.0	3.0	0.5	4
March	Not Sampled	139.8	-0.9	3.0	0.0	5
April	Not Sampled	110.7	-1.0	3.0	0.3	4
May	Not Sampled	108.5	-1.2	16.0	0.6	5
June	Not Sampled	75.8	-1.5	37.0	1.0	4
July	0.3	75.8	-1.4	35.0	0.3	4
August	<0.1	113.0	-0.9	31.0	1.2	5
September	<0.1	179.3	-0.6	11.0	0.0	4
October	<0.1	147.0	-0.7	6.0	0.3	4
November	<0.1	135.0	-0.9	4.0	0.0	5
December	Not Sampled	148.0	-0.8	11.0	0.3	4
Average	0.14	122.3	-1.0	13.5	0.4	4

Table 4 Chemical Usage Summary: Coagulant

Month	Average Dosage mg/L	Total kg
January	51.0	221
February	45.6	198
March	45.4	201
April	43.9	200
May	44.5	410
June	46.4	597
July	46.9	650
August	47.4	771
September	53.3	662
October	38.4	387
November	44.2	282
December	48.0	327
Average	46.2	409

Total Yearly Kilograms: 4,906

Table 5 Chemical Usage Summary: Sodium Hypochlorite

Month	Average Dosage mg/L	Total kg
January	4.43	19.2
February	4.26	18.6
March	4.36	18.6
April	4.37	20.0
May	3.71	33.1
June	3.39	43.7
July	3.73	51.7
August	3.99	63.3
September	3.85	47.6
October	3.69	36.0
November	3.53	22.7
December	3.83	26.0
Average	3.79	38

Total Yearly Kilograms: 400

Table 6 Chemical Usage Summary: Sodium Hydroxide

Month	Average Dosage mg/L	Total kg
January	2.1	9
February	2.3	10
March	2.2	9
April	2.6	12
May	3.6	35
June	5.0	64
July	5.8	77
August	5.3	80
September	4.3	51
October	3.6	36
November	2.7	17
December	2.6	17
Average	3.5	35

Total Yearly Kilograms: 419

Table 7 Chemical Usage Summary: Fluoride

Month	Average Dosage mg/L	Total kg
January	0.45	1.9
February	0.43	1.9
March	0.35	1.5
April	0.38	1.6
May	0.37	3.3
June	0.40	5.1
July	0.41	5.5
August	0.42	6.5
September	0.40	4.8
October	0.37	3.7
November	0.35	2.2
December	0.34	2.2
Average	0.39	3.0

Total Yearly Kilograms: 40

Port Severn 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

Michael Spicer
Director, Water and Wastewater Services

Stewart Hurd
Manager of Water and Wastewater Operations

Disclaimer: The following pages are not in an accessible format.

Drinking-Water Systems Regulation O. Reg. 170/03

ANNUAL REPORT

Drinking-Water System Number:	260001669
Drinking-Water System Name:	Lone Pine Water Treatment Plant – Port Severn
Drinking-Water System Owner:	District Municipality of Muskoka
Drinking-Water System Category:	Large Municipal Residential
Period being reported:	January 01 to December 31, 2021

Complete if your Category is Large Municipal Residential or Small Municipal Residential

Does your Drinking-Water System serve more than 10,000 people? Yes [ ] No [X]

Is your annual report available to the public at no charge on a web site on the Internet? Yes [X] No [ ]

Location where Summary Report required under O. Reg. 170/03 Schedule 22 will be available for inspection.

District Municipality of Muskoka
70 Pine Street
Bracebridge, Ontario
P1L 1N3
(705) 645-6764
www.muskoka.on.ca

Complete for all other Categories.

Number of Designated Facilities served:

N.A.

Did you provide a copy of your annual report to all Designated Facilities you serve?
Yes [ ] No [ ]

Number of Interested Authorities you report to: N.A.

Did you provide a copy of your annual report to all Interested Authorities you report to for each Designated Facility?
Yes [ ] No [ ]

Note: For the following tables below, additional rows or columns may be added or an appendix may be attached to the report

List all Drinking-Water Systems (if any), which receive all of their drinking water from your system:

Drinking Water System Name	Drinking Water System Number
N.A.	

Did you provide a copy of your annual report to all Drinking-Water System owners that are connected to you and to whom you provide all of its drinking water?
Yes [ ] No [ ]

Indicate how you notified system users that your annual report is available, and is free of charge.

[X] Public access/notice via the web
[X] Public access/notice via Government Office
[X] Public access/notice via a newspaper
[X] Public access/notice via Public Request
[ ] Public access/notice via a Public Library
[ ] Public access/notice via other method _____

Describe your Drinking-Water System

The water treatment plant serving the community of Port Severn was constructed in 1997. The treatment process consists of chemically assisted coagulation-flocculation, sedimentation and filtration using dual-media filters with a combination of sand and anthracite coal. Disinfection in a post-treatment chlorine contact chamber is followed by fluoridation and final pH adjustment before the treated water is pumped to our customers. Our waterworks currently serves a population of approximately 500 persons. The rated water production capacity of the plant is 1900 cubic meters per day. Our raw water source is Little Lake and the intake is located two meters above the lakebed at a depth of 4.5 meters and about 255 meters from shore.

List all water treatment chemicals used over this reporting period

Sodium Hypochlorite, Aluminum Sulphate, Sodium Hydroxide, Fluoride.

Were any significant expenses incurred to?

[ ] Install required equipment
[ ] Repair required equipment
[ ] Replace required equipment

Please provide a brief description and a breakdown of monetary expenses incurred

Provide details on the notices submitted in accordance with subsection 18(1) of the Safe Drinking-Water Act or section 16-4 of Schedule 16 of O.Reg.170/03 and reported to Spills Action Centre

Incident Date	Parameter	Result	Unit of Measure	Corrective Action	Corrective Action Date

Microbiological testing done under the Schedule 10, 11 or 12 of Regulation 170/03, during this reporting period.

	Number of Samples	Range of E.Coli Or Fecal Results (min #)-(max #)	Range of Total Coliform Results (min #)-(max #)	Number of HPC Samples	Range of HPC Results (min #)-(max #)
Raw	52	0 - 22	2 - 37	0	N.A.
Treated	52	0 - 0	0 - 0	52	0 – 0
Distribution	156	0 - 0	0 - 0	103	0 - 0

Operational testing done under Schedule 7, 8 or 9 of Regulation 170/03 during the period covered by this Annual Report.

	Number of Grab Samples	Range of Results (min #)-(max #)	Geometric Mean Average
Turbidity	8760	0.00 - 0.16 NTU	0.02 NTU
Chlorine	8760	1.25– 1.86 mg/l	1.53 mg/l
Fluoride (If the DWS provides fluoridation)	8760	0.49 - 0.67 mg/l	0.58 mg/l

__NOTE__: For continuous monitors use 8760 as the number of samples.

__NOTE__: Record the unit of measure if it is __not__ milligrams per litre.
MDL = Method Detection Limit

Summary of additional testing and sampling carried out in accordance with the requirement of an approval, order or other legal instrument.

Date of legal instrument issued	Parameter	Date Sampled	Result	Unit of Measure
N.A.				

Summary of Inorganic parameters tested during this reporting period or the most recent sample results

Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Antimony	May 10/2021	0.09	µg/L	No
Arsenic	May 10/2021	0.2	µg/L	No
Barium	May 10/2021	16.7	µg/L	No
Boron	May 10/2021	7	µg/L	No
Cadmium	May 10/2021	0.003	µg/L	No
Chromium	May 10/2021	0.32	µg/L	No
***Lead**	May 10/2021		µg/L	No
Mercury	May 10/2021	0.01	µg/L	No
Selenium	May 10/2021	0.04	µg/L	No
Sodium	May 10/2021	15.2	mg/L	No
Uranium	May 10/2021	0.003	µg/L	No
Fluoride	May 10/2021	0.37	mg/L	No
Nitrite	Feb 8/2021	0.003	mg/L	No

Nitrate	Feb 8/2021	0.068	mg/L	No
Nitrite	May 10/2021	0.003	mg/L	No
Nitrate	May 10/2021	0.136	mg/L	No
Nitrite	Aug 9/2021	0.003	mg/L	No
Nitrate	Aug 9/2021	0.049	mg/L	No
Nitrite	Nov 8/2021	0.003	mg/L	No
Nitrate	Nov 8/2021	0.067	mg/L	No

*only for drinking water systems testing under Schedule 15.2; this includes large municipal non-residential systems, small municipal non-residential systems, non-municipal seasonal residential systems, large non-municipal non-residential systems, and small non-municipal non-residential systems.

Summary of lead testing under Schedule 15.1 during this reporting period

(applicable to the following drinking water systems; large municipal residential systems**,** small municipal residential systems, and non-municipal year-round residential systems)

Location Type	Number of Samples	Range of Lead Results (min#) – (max #)	Geometric Mean Average	Unit of Measure	Number of Exceedances
Plumbing	0	N.A.	N.A.	µg/L	N.A.
Distribution	4	0.05 – 0.19	0.11	µg/L	0

Summary of Organic parameters sampled during this reporting period or the most recent sample results

Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Alachlor	May 10/2021	0.02	µg/L	No
Atrazine+N-dealkylated Metabolites	May 10/2021	0.01	µg/L	No
Azinphos-methyl	May 10/2021	0.05	µg/L	No
Benzene	May 10/2021	0.32	µg/L	No
Benzo(a)pyrene	May 10/2021	0.004	µg/L	No
Bromoxynil	May 10/2021	0.33	µg/L	No
Carbaryl	May 10/2021	0.05	µg/L	No
Carbofuran	May 10/2021	0.01	µg/L	No
Carbon Tetrachloride	May 10/2021	0.17	µg/L	No
Chorpyrifos	May 10/2021	0.02	µg/L	No
Diazinon	May 10/2021	0.02	µg/L	No
Dicamba	May 10/2021	0.2	µg/L	No
1,2 Dichlorobenzene	May 10/2021	0.41	µg/L	No
1,4 Dichlorobenzene	May 10/2021	0.36	µg/L	No
1,2 Dichloroethane	May 10/2021	0.35	µg/L	No
1,1 Dichloroethylene	May 10/2021	0.33	µg/L	No
Dichloromethane	May 10/2021	0.35	µg/L	No
2,4 Dichlorophenol	May 10/2021	0.15	µg/L	No
2,4-D	May 10/2021	0.19	µg/L	No

Diclofop-Methyl	May 10/2021	0.4	µg/L	No
Dimethoate	May 10/2021	0.06	µg/L	No
Diquat	May 10/2021	1	µg/L	No
Diuron	May 10/2021	0.03	µg/L	No
Glyphosate	May 10/2021	1	µg/L	No
Malathion	May 10/2021	0.02	µg/L	No
MCPA	May 10/2021		µg/L	No
Metolachor	May 10/2021	0.01	µg/L	No
Metribuzin	May 10/2021	0.02	µg/L	No
Monochlorobenzene	May 10/2021	0.3	µg/L	No
Paraquat	May 10/2021	1	µg/L	No
Pentachlorophenol	May 10/2021	0.15	µg/L	No
Phorate	May 10/2021	0.01	µg/L	No
Picloram	May 10/2021	1	µg/L	No
PCB	May 10/2021	0.04	µg/L	No
Prometryne	May 10/2021	0.03	µg/L	No
Simazine	May 10/2021	0.01	µg/L	No
THM (NOTE: Annual average of 4 samples – Distribution system)	Feb 8/2021 - Nov 8/2021	55	µg/L	No
HAA (NOTE: Annual average of 4 samples – Distribution system)	Feb 8/2021 - Nov 8/2021	51	ug/L	No
Terbufos	May 10/2021	0.01	µg/L	No
Tetrachloroethylene	May 10/2021	0.35	µg/L	No
2,3,4,6 - Tetrachlorophenol	May 10/2021	0.2	µg/L	No
Triallate	May 10/2021	0.01	µg/L	No
Trichloroethylene	May 10/2021	0.44	µg/L	No
2,4,6,- Trichlorophenol	May 10/2021	0.25	µg/L	No
Trifluralin	May 10/2021	0.02	µg/L	No
Vinyl Chloride	May 10/2021	0.17	µg/L	No

List any Inorganic or Organic parameter(s) that exceeded half the standard prescribed in Schedule 2 of Ontario Drinking Water Quality Standards.

Parameter	Result Value	Unit of Measure	Date of Sample
THM	55	ug/L	Annual running average
HAA	51	ug/L	Annual running average