2020 Year End Report: Bracebridge Potable Water Plant

Drinking Water Works Permit: 143-206

Municipal Drinking Water License: 143-106

Ministry of Environment, Conservation and Parks Waterworks #: 220007276

Engineering and Public Works Department

70 Pine Street, Bracebridge, Ontario P1L 1N3

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Introduction

The Bracebridge Potable Water Plant (PWP) services the community of Bracebridge and is owned and operated by the District Municipality of Muskoka.

It was constructed in 1995 and has an initial design capacity of 10,000 m^3 per day. The water system currently serves a population of approximately 9,400 people.

The plant operates under license 143-106 and permit 143-206, issued in September 2020 under the Municipal Drinking Water Licensing Program. The plant also presently operates under Ministry of Environment, Conservation and Parks (MOECP) permit to take water #2450-AV2JRU (expires February 16, 2028), which permits the operation of up to 10,000 m^3 per day.

The Raw Water intake structure is located near Kirby's Beach in Lake Muskoka approximately 18 meters deep and 500 meters from shore.

The treatment system features pre-treatment consisting 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 customers.

The distribution system includes one in ground reservoir and one above ground storage tank supplying Bracebridge.

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 MOECC 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 MOECC 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 Bracebridge Potable Water Plant has a rated capacity of 10,000 m^3 per day. In 2020, the total monthly average flow for the year was 3,693 m^3 per day. The maximum day flow for the year was 6,310 m^3 per day, however the 3-year average for maximum day flow is 5,857 m^3 per day. This represents 59% 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 #2450-AV2JRU) permits 10,000 m^3 per day; therefore there were no exceedances of this permit.

Summary of Analytical Results

A total of 396 microbiological regulatory tests were performed in 2020 and compliance with Provincial standards was achieved throughout the entire year.

There were 666 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 Bracebridge PWP:

- Aluminum Sulfate: Coagulant
- Sodium Hydroxide: pH Adjustment
- Hydrofluosilicic Acid: Fluoride Dental supplement
- Hydrated Lime: Alkalinity
- Carbon Dioxide: pH Adjustment
- Sodium Hypochlorite: Disinfectant

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

Documentation of System Repairs and Upgrades

No significant capital expenses were incurred to conduct system repairs or upgrades in 2020.

External Audits

MOE Inspection

A MOE inspection was completed on August 5, 2020 and is attached to this report. The overall rating was 100%.

DWQMS Audit

In 2020 all drinking water systems within the District had an off-site external 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.

Bracebridge Water Distribution Summary 2020

New Services:

A total of 84 customers connected to existing serviced properties in 2020.

Broken Watermains:

Ten water main breaks occurred in 2020.

Service Leaks:

Ten municipal service leaks was reported and repaired in 2020.

Service Relocation:

There were no service relocations to report in 2020.

Frozen Services:

No municipal water services were frozen in 2020.

Replacement Watermains:

There was no water main replacement in Bracebridge in 2020

New Watermains:

Approximately 940m of new water main was installed in the Clearbrook (Mattamy) subdivision by the developers contractors servicing new street's called Browning Blvd and Mossy Oak Crescent. This extension also created a new Watermain loop in the water distribution system which will improve water quality in the system with reduced maintenance.

Valve Replacement:

2 mainline valves were replaced and one repaired in 2020.

Fire Hydrants:

There are 653 Municipality assumed hydrants maintained by the District in the Town of Bracebridge. All hydrants were pumped dry in the fall, and scoped during the winter months to ensure they are not susceptible to freezing. 5 additional hydrants were added in 2020 as well as 1 being replaced.

Meter Installations:

A total of 270 water meters were replaced in Bracebridge in 2020 as part of the aged meter change out program. The average meter age in Bracebridge is 9 years.

Turn on/offs:

District field staff responded to 137 water turn on/off requests in 2020.

Air-Vacuum Release Valves:

Twenty eight air release valves were inspected and tested for proper operation in 2020. Each of the chambers was inspected and pumped out as required.

Locates:

The District, either in-house or with contracted staff, completed 999 buried utility locate requests in 2020 to comply with Ontario OneCall requests.

Table 1 Water Flow Summary - 2020

Month	Total Monthly (m^3)	Average Day Flow (m^3/d)	Maximum Day Flow (m^3/d)	Minimum Day Flow (m^3/d)
January	105,755	3,411	4,140	3,175
February	97,228	3,353	3,502	3,171
March	100,550	3,244	3,368	3,022
April	101,811	3,394	6,310	3,015
May	116,805	3,768	4,477	3,142
June	130,556	4,352	5,972	3,788
July	137,125	4,423	5,516	3,661
August	123,202	3,974	4,390	3,468
September	112,428	3,748	4,106	3,494
October	108,239	3,492	3,772	3,144
November	102,904	3,430	4,048	2,100
December	114,776	3,702	5,767	3,175

Total Flow: 1,351,379
Average Day: 3,693
Maximum Day: 6,310
Minimum Day: 2,100

Table 2 Raw Water Monthly Analysis Summary 2020 Part 1

Month	Alkalinity (mg/L)	Hardness (mg/L)	pH	Turbidity (ntu)	True Colour (tcu)	Temperature (Celsius)
January	6.8	13.1	6.7	0.4	16	4.1
February	7.0	13.8	6.7	0.4	16	4.2
March	6.4	12.2	6.6	0.4	16	4.4
April	6.2	12	6.5	0.55	18	5.6
May	6.1	12.4	6.6	0.5	18	8.5
June	6.2	10.0	6.7	0.4	15	10.8
July	5.9	10.3	6.6	0.4	15	12.2
August	5.9	10.0	6.5	0.3	15	12.4
September	6.0	11.1	6.4	0.4	14	12.8
October	6.3	10.0	6.8	0.4	13	13.4
November	6.6	11.6	6.7	0.4	13	10.0
December	6.1	11.7	6.8	0.4	15	6.5
Average	6.3	11.5	6.6	0.4	15.2	8.7

Table 3 Raw Water Monthly Analysis Summary 2020 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	29.4	-3.4	7.0	0.2	4
February	Not Sampled	29.2	-3.3	6.0	0.0	4
March	Not Sampled	51.9	-3.5	7.0	0.0	5
April	Not Sampled	47.0	-3.6	7.0	0.0	4
May	0.1	47.0	-3.4	6.0	0.3	4
June	0.1	23.7	-3.3	7.0	0.4	5
July	0.1	24.3	-3.6	34.0	0.5	4
August	0.1	24.7	-3.6	52.0	0.5	5
September	0.1	24.4	-3.7	13.0	1.8	4
October	0.1	24.8	-3.4	13.0	4.5	4
November	0.1	23.5	-3.3	17.0	7.0	4
December	Not Sampled	23.9	-3.2	20.0	8.8	5
Average	0.1	31.2	-3.4	15.8	2.0	4

Table 4 Chemical Usage Summary: CO2

Month	Average Dosage mg/L	Total kg
January	25.7	2,662.8
February	24.1	2,298.0
March	23.0	2,279.4
April	22.6	2,278.5
May	23.7	2,743.7
June	26.5	3,451.9
July	23.6	3,244.4
August	22.3	2,734.4
September	22.4	2,507.6
October	25.2	2,711.7
November	24.2	2,471.0
December	25.5	2,909.5
Average	24.1	2691.1
Total	N/A	32,293

Table 5 Chemical Usage Summary: Hydrated Lime

Month	Average Dosage mg/L	Total kg
January	31.7	3,288.6
February	34.3	3,266.5
March	34.8	3,446.2
April	34.8	3,510.5
May	33.8	3,902.6
June	32.1	4,185.3
July	32.1	4,396.4
August	32.1	3,943.0
September	32.1	3,603.3
October	31.0	3,336.1
November	30.2	3,095.0
December	31.2	3,542.7
Average	33	3626.3
Total	N/A	43,516

Table 6 Chemical Usage Summary: Coagulant

Month	Average Dosage mg/L	Total kg
January	29.3	3,036
February	28.6	2,727
March	29.0	2,872
April	28.3	2,842
May	27.8	3,206
June	28.4	3,695
July	27.5	3,752
August	26.9	3,295
September	27.7	3,113
October	24.3	2,522
November	26.0	2,660
December	26.4	3,018
Average	27.5	3061
Total	N/A	36,738

Table 7 Chemical Usage Summary: Sodium Hydroxide

Month	Average Dosage mg/L	Total kg
January	12.5	1,295
February	12.2	1,161
March	11.7	1,148
April	11.2	1,109
May	11.1	1,260
June	11.4	1,459
July	12.0	1,606
August	10.8	1,296
September	11.1	1,224
October	11.9	1,250
November	11.2	1,128
December	12.0	1,346
Average	11.6	1274
Total	N/A	15,284

Table 8 Chemical Usage Summary: Fluoride

Month	Average Dosage mg/L	Total kg
January	0.62	64.0
February	0.59	56.2
March	0.61	59.7
April	0.60	60.2
May	0.50	55.0
June	0.54	69.3
July	0.55	74.9
August	0.68	81.4
September	0.74	81.4
October	0.72	76.2
November	0.73	72.9
December	0.75	84.6
Average	0.64	70
Total	N/A	836

Table 9 Chemical Usage Summary: Sodium Hypochlorite

Month	Average Dosage mg/L	Total kg
January	3.10	320.8
February	2.66	253.8
March	2.71	268.3
April	2.85	287.1
May	2.98	344.7
June	3.20	418.2
July	3.38	462.6
August	3.11	382.8
September	3.25	364.4
October	3.61	387.6
November	3.40	348.2
December	2.88	330.0
Average	3.19	370
Total	N/A	4,168

Bracebridge 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, Water and Wastewater Services

Mark Pringle, C.E.T.
Manager of Water and Wastewater Operations

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

OPTIONAL ANNUAL REPORT TEMPLATE

Drinking-Water System Number:	220007276
Drinking-Water System Name:	Bracebridge (Kirby's Beach) Potable Water Plant
Drinking-Water System Owner:	District Municipality of Muskoka
Drinking-Water System Category:	Large Municipal Residential
Period being reported:	January 01 to December 31, 2020

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

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

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:

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 [X]

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 Bracebridge was constructed in 1995. The system features pre-treatment consisting 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. The water system currently serves a population of approximately 9,400. The rated water production capacity of the plant is 10,000 cubic meters per day. Our raw water source is Lake Muskoka where the intake is located two meters above the lakebed at a depth of 18 meters and about 500 meters from shore.

List all water treatment chemicals used over this reporting period

Carbon Dioxide, Aluminum Sulphate, Hydrated Lime, Sodium Hypochlorite, Hydrofluosilicic Acid, and Sodium Hydroxide.

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
April 29, 2020	Loss of pressure	Cat 2 WM break	N/A	Repair WM	April 29, 2020
September 15, 2020	Loss of pressure	Cat 2 WM break	N/A	Repair WM	Sept 15, 2020

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 - 37	0 - 67	0	NA
Treated	52	0 - 0	0 - 0	52	0 - 3
Distribution	292	0 - 0	0 - 0	132	0 - 13

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 #)	Geomean
Turbidity	8760	0.04 – 0.26	0.052
Chlorine	8760	1.31 – 2.20	1.69
Fluoride (If the DWS provides fluoridation)	8760	0.2 – 0.82	0.64

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

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

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 5/20	0.09<MDL	µg/L	No
Arsenic	May 5/20	0.2<MDL	µg/L	No
Barium	May 5/20	11.5	µg/L	No
Boron	May 5/20	5	µg/L	No
Cadmium	May 5/20	0.011	µg/L	No
Chromium	May 5/20	0.5	µg/L	No
***Lead**	May 5/20			
Mercury	May 5/20	0.01<MDL	µg/L	No
Selenium	May 5/20	0.04<MDL	µg/L	No
Sodium	May 5/20	14.4	mg/L	No

Uranium	May 5/20	0.002	µg/L	No
Fluoride	May 5/20	0.44	mg/L	No
Nitrite	Feb 10/20	0.003<MDL	mg/L	No
Nitrate	Feb 10/20	0.189	mg/L	No
Nitrite	May 5/20	0.003<MDL	mg/L	No
Nitrate	May 5/20	0.211	mg/L	No
Nitrite	Aug 11/20	0.003<MDL	mg/L	No
Nitrate	Aug 11/20	0.241	mg/L	No
Nitrite	Nov 10/20	0.003<MDL	mg/L	No
Nitrate	Nov 10/20	0.199	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 #)	Unit of Measure	Number of Exceedances
Plumbing				
Distribution	7	0.01-0.09	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 5/20	0.02<MDL	µg/L	No
Atrazine + N-dealkylated metabolites	May 5/20	0.01	µg/L	No
Azinphos-methyl	May 5/20	0.05<MDL	µg/L	No
Benzene	May 5/20	0.32<MDL	µg/L	No
Benzo(a)pyrene	May 5/20	0.004<MDL	µg/L	No
Bromoxynil	May 5/20	0.33<MDL	µg/L	No
Carbaryl	May 5/20	0.05<MDL	µg/L	No
Carbofuran	May 5/20	0.01<MDL	µg/L	No
Carbon Tetrachloride	May 5/20	0.17<MDL	µg/L	No
Chlorpyrifos	May 5/20	0.02<MDL	µg/L	No
Diazinon	May 5/20	0.02<MDL	µg/L	No
Dicamba	May 5/20	0.20<MDL	µg/L	No
1,2-Dichlorobenzene	May 5/20	0.41<MDL	µg/L	No
1,4-Dichlorobenzene	May 5/20	0.36<MDL	µg/L	No
1,2-Dichloroethane	May 5/20	0.35<MDL	µg/L	No
1,1-Dichloroethylene (vinylidene chloride)	May 5/20	0.33<MDL	µg/L	No
Dichloromethane	May 5/20	0.35<MDL	µg/L	No
2-4 Dichlorophenol	May 5/20	0.15<MDL	µg/L	No
2,4-Dichlorophenoxy acetic acid (2,4-D)	May 5/20	0.19<MDL	µg/L	No
Diclofop-methyl	May 5/20	0.40<MDL	µg/L	No

Dimethoate	May 5/20	0.06<MDL	µg/L	No
Diquat	May 5/20	1<MDL	µg/L	No
Diuron	May 5/20	0.03<MDL	µg/L	No
Glyphosate	May 5/20	1<MDL	µg/L	No
Malathion	May 5/20	0.02<MDL	µg/L	No
MCPA	May 5/20	0.00012<MDL	µg/L	No
Metolachlor	May 5/20	0.01<MDL	µg/L	No
Metribuzin	May 5/20	0.02<MDL	µg/L	No
Monochlorobenzene	May 5/20	0.30<MDL	µg/L	No
Paraquat	May 5/20	1<MDL	µg/L	No
Pentachlorophenol	May 5/20	0.15<MDL	µg/L	No
Phorate	May 5/20	0.01<MDL	µg/L	No
Picloram	May 5/20	1<MDL	µg/L	No
Polychlorinated Biphenyls(PCB)	May 5/20	0.04<MDL	µg/L	No
Prometryne	May 5/20	0.03<MDL	µg/L	No
Simazine	May 5/20	0.01<MDL	µg/L	No
THM (NOTE: annual average from Distribution – 4 samples)	Samples Taken: Feb.10/20 May 05/20 Aug.11/20 Nov 10/20	68.5	µg/L	No
Terbufos	May 5/20	0.01<MDL	µg/L	No
Tetrachloroethylene	May 5/20	0.35<MDL	µg/L	No
2,3,4,6-Tetrachlorophenol	May 5/20	0.20<MDL	µg/L	No
Triallate	May 5/20	0.01<MDL	µg/L	No
Trichloroethylene	May 5/20	0.44<MDL	µg/L	No
2,4,6-Trichlorophenol	May 5/20	0.25<MDL	µg/L	No
Trifluralin	May 5/20	0.02<MDL	µg/L	No
Vinyl Chloride	May 5/20	0.17<MDL	µg/L	No
HAA5 (Distribution Water)	Samples Taken:			
	Feb.10/20	47.3	µg/L	No
	May 05/20	50.4	µg/L	No
	Aug.11/20	66.8	µg/L	No
	Nov 10/20	67.6	µg/L	No
	RAA	58.0	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 (annual avg.)	**68.5**	µg/L	**Annual Average**
HAA5 (annual avg.)	**58.0**	µg/L	**Annual Average**