innservices

Water Operations

Annual Summary Report

~ Innisfil Lake Simcoe Drinking Water System ~

~ Town of Innisfil ~

DWS #220007472

Reporting Year - 2020

InnServices Utilities Inc.

Introduction

Effective January 1, 2016, the Town of Innisfil transferred ownership of its municipal drinking water systems to InnServices Utilities Inc. (InnServices). InnServices is a municipal service corporation, wholly-owned by the Town of Innisfil, charged with the responsibility to operate, maintain and expand the municipal drinking water systems that service the Town of Innisfil.

The Innisfil Lake Simcoe Drinking Water System (ILS DWS) services a population of approximately 26,600, on 8656 residential connections, with an additional 117 non-residential connections. The distribution system is comprised of approximately 183 kilometers of various sized ductile iron, concrete, asbestos cement and PVC piping, and approximately 821 hydrants and 1106 valves placed strategically throughout the system.

The system relies on surface water drawn directly from Lake Simcoe, and processed at the Lakeshore Water Treatment Plant (WTP).

InnServices has prepared this Annual Summary Report for the operations conducted during the 2020 calendar year.

This Annual Summary Report has been prepared to meet the following commitments:

- To provide InnServices Utilities Inc. Board of Directors, as “Owners” of the drinking water system, a summary of the operations and maintenance of the Innisfil Lake Simcoe Drinking Water System that took place during the reporting period of January 1,2020 to December 31, 2020;
- To provide a status update of the systems capabilities and capacities as of December 31, 2020, and;
- To satisfy the requirements of O. Reg 170/03 Section 11
- To satisfy the requirements of O. Reg.170/03 Schedule 22

The Annual Summary Report identifies specific details regarding the overall quality of the drinking water submitted to the Ministry of the Environment Conservation and Parks (MECP) for the Innisfil Lake Simcoe Drinking Water System and is available on the Town of Innisfil website (https://innisfil.ca/annual-reports-drinking-water) and at InnServices Headquarters at 7251 Yonge St., Innisfil, Ontario.

This report provides information to the InnServices Board of Directors and Town of Innisfil Mayor and Council related to the operations, maintenance, drinking water quality, and system capacities of the Innisfil Lake Simcoe Drinking Water System, which aids decision making related to system expansion needs, and assists Board and Council in meeting their Statutory Standard of Care requirements.

MECP Approvals

The Innisfil Lake Simcoe Drinking Water System is classified as a Large Municipal Residential drinking water system, as defined within Ontario Regulation 170/03.

The **Safe Drinking Water Act, 2002** requires that the Owner of a municipal drinking water system have MECP approvals in the form of a Drinking Water Works Permit (DWWP) and a Municipal Drinking Water Licence (MDWL). The DWWP provides a description of the overall system and provides the authority to establish or alter the drinking water system. The MDWL provides the authority to use or operate the system. The Innisfil Lake Simcoe DWS operated for the majority of the year under

DWWP # 120-203, Issue #5
MDWL # 120-103, Issue #5

New DWWP and MDWL were issued December 15, 2020:

DWWP # 120-203, Issue #6
MDWL # 120-103, Issue #6

For the reporting period covered in this report, InnServices Utilities Inc. was defined as the Operating Authority of the Innisfil Lake Simcoe Drinking Water System.

InnServices Utilities Inc. has established and maintains accreditation to the Drinking Water Quality Management Standard Version 2-2017 (DWQMS) under Certificate of Accreditation # 0136878, issued November 4, 2020 by SAI Global. The Certificate of Accreditation expires September 20, 2023.

Drinking Water System

The System consists of a Surface Water Treatment Plant (WTP) and associated low lift pumping station, 3 in-ground storage facilities, 4 elevated storage facilities and 5 booster pumping stations.
Disinfection is achieved by two-stage membrane filtration trains equipped with primary UV treatment for Cryptosporidium and Giardia; Granular Activated Carbon Contactors (GACC) are used for taste and odour control; post chlorination achieves acceptable contact time (CT), and final chlorination to distribution maintains secondary chlorine residuals.
Sulphuric acid, sodium hypochlorite and citric acid are used for membrane clean-in-place (CIP) processing; sodium hydroxide and sodium bisulphite are used as neutralizing agents.
Significant expenses for installation, repair or replacement of required equipment included:

$250,000 Bradford Water Transmission Main – inspection and repair watermain valves. Project began in 2020, completion in 2021
$57,000 WTP – redundant compressor and associated piping and programming
$30,000 3rd Line Booster – pump and motor repairs, and associated programming
$13,500 WTP – refurbish chlorine scrubber
$10,900 WTP – replacement UV Transmittance analyzer
$9,600 WTP – Raw water intake inspection (2019) and cleaning (2020)
$7,700 WTP – security gate & programming
$7,220 Fennels Monitoring Station – replacement flow meter and associated programming
$5,500 Lefroy Reservoir - Highlift pump and motor repair

Analytical Laboratory Water Quality Monitoring

Bacteriological Analysis

Bacteriological testing is completed to verify that no microbiological contamination of the treated drinking water can be detected. Raw water is also analyzed to inform operations of the level of microbiological contamination within the drinking water system.

Bacteriological monitoring for the reporting period was conducted as required by Ontario Regulation 170/03.

SGS Environmental Services, Lakefield, Ontario, conducted the bacteriological analysis of the drinking water.

There were two (2) items of non-compliance with the Ontario Drinking Water Standards related to bacteriological analyses occurred during the reporting period. These were reported to Spills Action Centre and the Simcoe Muskoka District Health Unit as required.

Incident Date	*Parameter*	*Result*	*Unit of Measure*	*Corrective Action*	*Corrective Action Date (dd/mm/yy)*
April 8, 2020	Total Coliform	3	Cfu/100mL	Resample test	April 8, 2020
June 10, 2020	Total Coliform	3	Cfu/100mL	Resample test	June 11, 2020

Microbiological testing done under the Schedule 10 of Regulation 170/03, during this reporting period:

	Number of Samples	*Range of E.coli Results min.-max.*	*Range of Total Coliform Results min.-max.*	*Number of HPC Samples*	*Range of HPC Results min.-max.*
Raw	52	0 – 2	0 - 55	n/a	n/a
Treated	52	0 - 0	0 - 0	52	0 - 30
Distribution	608	0 - 0	0 - 3	597	0 - 203

Chemical Analysis

Chemical analysis of this water supply is conducted as required by Ontario Regulation 170/03.
SGS Environmental Services, Lakefield, Ontario, conducted the required chemical analyses for the drinking water system during the reporting period. This lab, as well as any laboratories to which they sub-contract certain types of analyses, are licensed by the MECP and accredited by the Canadian Association for Laboratory Accreditation (CALA) and/or Standard Council Canada (SCC).

There were zero (0) reports of non-compliance with Ontario Drinking Water Standards related to chemical analysis was reported during 2020.

A summary of all analytical results for Organic and Inorganic testing completed during the reporting period is attached in Appendix A.

Continuous Water Quality Monitoring

Filter Effluent Turbidity

The Procedure for Disinfection of Drinking Water in Ontario requires turbidity of 0.10 NTU (100 mNTU) in 99% of monthly measurements of filtered water turbidity. This criterion was met in 2020 with a monthly average measurement of 99.97%.

Free Chlorine Residual

The Innisfil Lake Simcoe Water Filtration Plant utilized NSF® certified chlorine gas to meet post disinfection requirements and provide an adequate chlorine residual for secondary disinfection requirements. A requirement of O.Reg. 170/03 and the Procedure for Disinfection of Drinking Water in Ontario is that chlorine residual must be recorded at the point directly after primary disinfection is achieved, at a frequency of every 5 minutes.

5-minute data collection	*Compliance*	*Results*	*Unit of Measure*
Chlorine	0.05	1.08 – 5.00	Mg/L

All instances where Free Chlorine Residual (FCR) was less than 1.00 mg/L were investigated and confirmed to coincide with a power outage, calibration activities, and/or disinfection calculations were completed to confirm CT was met.

Harmful Algal Bloom (HAB)

InnServices has implemented a proactive program for the monitoring of Harmful Algal Bloom (Blue-green algae), which can have mild to serious health effects.

The program includes weekly sampling of raw and treated water to test for Microcystin, a toxin produced by the algae bloom, from June 1 – October 31.

On October 9, a public notice was issued related to a sighting in Cook's Bay, well outside of the WTP Intake Protection Zone. In consultation with the Simcoe Muskoka District Health Unit, sampling continued until the status of the HAB was resolved December 7.

All sample results for microcystin were below the detectable limit of 0.1 μg/Liter. Maximum allowable concentration is 1.5 μg/Liter.

UV Disinfection – Ultra Filtration Membrane

UV disinfection is provided as a primary barrier to inactivate *Giardia* and *Cryptosporidium.* Water flows through fine strainers, then splits into two separate UV reactor feed lines. These operate one at a time. A minimum continuous pass-through dose of 5.2 mJ/cm2 (milliJoules per square centimeter) must be maintained.

The flow then discharges to the Ultra Filtration membranes.

Membrane filtration is a pressure-driven, liquid-phase separation process which uses microporous membranes to remove contaminants from the water. The membrane treatment process forces the pre-treated water through the UF membrane, leaving contaminants behind on the feed side of the membrane. The filtered water (or permeate) can pass though the pores of the membrane and continue through to the next treatment process.

The flow can be directed to the GAC Contactors (granular active carbon, for taste and odour control) then to the Chlorine Contact Tanks (CCT); or it can bypass the GACC and go directly to the CCT.

Post chlorination is provided in the CCT after the membranes and to provide disinfection against viruses. It then flows to clearwells where additional chlorine can be added if necessary, before being pumped into the distribution system.

Secondary Disinfection

Within the distribution system NSF® certified 12% sodium hypochlorite can be added to the water at the Alcona or Lefroy Reservoirs or Goldcrest standpipe to ensure adequate levels of chlorine are available to protect the water from microbiological contamination as it moves through the distribution system and is delivered to homes and businesses.

Chlorine residual is continuously monitored in numerous locations throughout the distribution system. Additionally, grab samples are taken and analyzed for free chlorine residual when microbiological samples are taken throughout the distribution system.

Ontario Regulation 170/03 requires that sufficient residual be available in the water to achieve a residual of greater than 0.05 mg/L at all points in the distribution system.

During the reporting period covered by this report, there was one (1) incident of non-compliance related to Continuous Water Quality Monitoring. This occurred at a dead-end in an un-assumed subdivision. Public health was not at risk.

Incident Date	*Parameter*	*Result*	*Unit of Measure*	*Corrective Action*	*Corrective Action Date (dd/mm/yy)*
July 22, 2020	Operational - Low Chlorine Residual	0.0	Mg/L	Flush and resample test	July 22, 2020

Plant Flow Monitoring

Raw Water Takings

The Innisfil Lake Simcoe Water Filtration Plant (ILS WTP) utilizes Lake Simcoe as its raw water source. The raw water takings from Lake Simcoe are authorized by the MECP through a Permit to Take Water (PTTW) # 3220-A6HJR4. Raw water takings for 2020 were reported to the electronic Water Taking Recording System (WTRS).

Table 1 below provides a summary of the ILS WTP raw water takings from Lake Simcoe in 2020.

Table 1: Summary of 2020 Raw Water Takings

	Units	**Takings under PTTW # 3220-A6HJR4**
PTTW Daily Maximum	(m^3/day)	45,000
Maximum Day	(m^3/day)	20,980
Average Day	(m^3/day)	11,818
Total Annual Takings	(m^3)	4,325,477

Performance Summary

The volume of daily treated water production is authorized by the MECP through the designation of a Plant Rated Capacity within the Municipal Drinking Water Licence (MDWL). The system is operating at approximately 30% of the rated capacity of 38 MLD. At the maximum flow, treated water demand flow in 2020 was 53% of the rated capacity.

Based on total annual raw water takings and treated water production values, the ILS WTP operated at an efficiency of 97%.

Table 2 below provides a summary of the ILS WTP treated water production in 2020. Zero (0) incidents of non-compliance related to the plant's rated capacity were reported in 2020.

Table 2: Summary of 2019 Treated Water Production

System Rated Capacity (m^3/day)	38,000
Maximum Day (m^3/day)	20,100
Average Day (m^3/day)	11,440
Total Annual Demand (m^3)	4,187,220
System Performance-rated capacity	30%
System Performance – at Maximum Flow	53%

Distribution Flow Monitoring

The ILS WTP produces water for distribution to homes and businesses within the Town of Innisfil (TOI) and also transmits water to the Town of Bradford West Gwillimbury (BWG) to help meet the drinking water needs of their residents.

Approximately 49**%** of the water produced at ILS WTP was supplied to Bradford-West Gwillimbury (BWG) in 2020.

The following table and graph demonstrate the volume of the ILS WTP production that was directed to Town of Innisfil and Town of BWG during 2020.

Table 3: Monthly volumes (MLD = 1000 m3) of drinking water directed toward TOI and BWG distribution systems in 2020.

Month	Treated Water Production (MLD)	BWG Use (MLD)	TOI Use (MLD))
January	342.1	195.5	146.6
February	331.7	187.1	144.6
March	343.8	184.5	159.3
April	324.0	164.2	159.9
May	378.2	195.5	182.7
June	445.7	214.5	231.2
July	499.1	255.4	243.7
August	424.5	212.5	212.0
September	374.0	98.9	275.1
October	366.2	179.2	187.0
November	347.0	169.6	177.4
December	356.8	178.0	178.9
Total	4533.1	2234.8	2298.3

MECP Annual Inspection

An Unannounced Focused inspection was conducted on October 28-29, 2020 by the Ministry of the Environment Conservation & Parks. The inspection covered the period of September 19, 2019 to October 29, 2020.

Items of Non-compliance

There were two (2) items of non-compliance identified.

1. Section 1-2(2), Schedule 1 of O. Reg 170/03 requires the operating authority to ensure that at all times and at all locations within the distribution system the free chlorine residual is never less than 0.05 mg/L. Records provided by the Operating Authority indicate that the water treatment equipment was operated in a manner so that at all times and all locations within the distribution system, the free available chlorine residual was never less than 0.05 mg/L with the following one exception:

   July 22, 2020- A result of 0.0 mg/L free chlorine residual reading was obtained at beginning of a proactive dead-end hydrant flushing event located within a residential area still under development. Appropriate corrective actions were immediately effected.

   Action Required: No recommendation. Appropriate corrective actions were immediately effected.
2. Documents from the Operating Authority indicate that the Duty UV sensors are checked on at least a monthly basis against a reference UV sensor. The duty sensor is to be verified against a Master Reference Assembly at a minimum frequency of once every three years. The UVSwift24 Irradiance Sensor was last calibrated by the manufacturer on January 13, 2017 prior to being installed and commissioned at the treatment facility and was due to be verified by the manufacturer on or about January 13, 2020.

   Action required: No action required. The Operating Authority had effected arrangements before the physical inspection date to engage the manufacturer to have the duty sensor verified against a Master Reference Assembly.

Provincial Officer's Orders

No Provincial Officer's Orders were issued in the Report as a result of the 2020 inspection.

Inspection Risk Rating

This year the Innisfil Lake Simcoe system received an Inspection Risk Rating of 6.23%, resulting in a Compliance Rating of 93.77%.

Appendix A – Chemical Analysis

Organic and Inorganic parameters testing is required at least once every 12 months from a raw water supply that is surface water.

Inorganic Parameter	*Sample Date (dd/mm/yy)*	*Result Value*	*Unit of Measure*	*Exceedance*
Antimony	09-Nov-2020	<0.09	µg/L	No
Arsenic	09-Nov-2020	0.5	µg/L	No
Barium	09-Nov-2020	27.4	µg/L	No
Boron	09-Nov-2020	16	µg/L	No
Cadmium	09-Nov-2020	0.003	µg/L	No
Chromium	09-Nov-2020	0.78	µg/L	No
Mercury	09-Nov-2020	< 0.01	µg/L	No
Selenium	09-Nov-2020	0.06	µg/L	No
Uranium	09-Nov-2020	0.379	µg/L	No

Parameter	*Sample Date (dd/mm/yy)*	*Result Value*	*Unit of Measure*	*Exceedance*
Alachlor	09-Nov-2020	<0.02	µg/L	No
Atrazine + N-dealkylated metobolites	09-Nov-2020	<0.01	µg/L	No
Azinphos-methyl	09-Nov-2020	<0.05	µg/L	No
Benzene	09-Nov-2020	<0.32	µg/L	No
Benzo(a)pyrene	09-Nov-2020	<0.004	µg/L	No
Bromoxynil	09-Nov-2020	<0.32	µg/L	No
Carbaryl	09-Nov-2020	<0.05	µg/L	No
Carbofuran	09-Nov-2020	<0.01	µg/L	No
Carbon Tetrachloride	09-Nov-2020	<0.17	µg/L	No
Chlorpyrifos	09-Nov-2020	<0.02	µg/L	No
Diazinon	09-Nov-2020	<0.02	µg/L	No
Dicamba	09-Nov-2020	<0.20	µg/L	No
1,2-Dichlorobenzene	09-Nov-2020	<0.41	µg/L	No
1,4-Dichlorobenzene	09-Nov-2020	<0.36	µg/L	No
1,2-Dichloroethane	09-Nov-2020	<0.35	µg/L	No
1,1-Dichloroethylene (vinylidene chloride)	09-Nov-2020	<0.33	µg/L	No
Dichloromethane	09-Nov-2020	<0.35	µg/L	No
2-4 Dichlorophenol	09-Nov-2020	<0.15	µg/L	No
2,4-Dichlorophenoxy acetic acid (2,4-D)	09-Nov-2020	<0.19	µg/L	No
Diclofop-methyl	09-Nov-2020	<0.40	µg/L	No
Dimethoate	09-Nov-2020	<0.03	µg/L	No
Diquat	09-Nov-2020	<1	µg/L	No
Diuron	09-Nov-2020	<0.03	µg/L	No
Glyphosate	09-Nov-2020	<1	µg/L	No
Malathion	09-Nov-2020	<0.02	µg/L	No
2-Methyl-4-chlorophenoxyacetic acid (MCPA)	09-Nov-2020	<0.12	µg/L	No
Metolachlor	09-Nov-2020	<0.01	µg/L	No
Metribuzin	09-Nov-2020	<0.02	µg/L	No
Monochlorobenzene	09-Nov-2020	<0.3	µg/L	No

Paraquat	09-Nov-2020	<1	µg/L	No
Pentachlorophenol	09-Nov-2020	<0.15	µg/L	No
Phorate	09-Nov-2020	<0.01	µg/L	No
Picloram	09-Nov-2020	<1	µg/L	No
Polychlorinated Biphenyls(PCB)	09-Nov-2020	<0.04	µg/L	No
Prometryne	09-Nov-2020	<0.03	µg/L	No
Simazine	09-Nov-2020	<0.01	µg/L	No
Terbufos	09-Nov-2020	<0.01	µg/L	No
Tetrachloroethylene	09-Nov-2020	<0.35	µg/L	No
2,3,4,6-Tetrachlorophenol	09-Nov-2020	<0.20	µg/L	No
Triallate	09-Nov-2020	<0.01	µg/L	No
Trichloroethylene	09-Nov-2020	<0.44	µg/L	No
2,4,6-Trichlorophenol	09-Nov-2020	<0.25	µg/L	No
Trifluralin	09-Nov-2020	<0.02	µg/L	No
Vinyl Chloride	09-Nov-2020	<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*
N/A			

One water sample is taken every 60 months to test for Sodium and Fluoride

Parameter	*Date of Sample*	*Result*	*Unit of Measure*	*Exceedance*
Sodium	14-Dec-2016	27.9	mg/L	Yes
Fluoride	14-Dec-2016	<0.1	mg/L	No

One water sample is taken every 3 months and tested for nitrate and nitrite

Parameter	*Date of latest Sample*	*Result*	*Unit of Measure*	*Exceedance*
Nitrite	18-Nov-2020	< 0.003	mg/L	No
Nitrate	18-Nov-2020	0.095	mg/L	No

<u>Distribution Sampling (Lead, THM and HAA)</u>

Based on results of community lead sampling conducted, the Innisfil Lake Simcoe DWS has qualified for reduced sampling protocol as per O. Reg. 170/03 Schedule 15.1. Under this protocol, only alkalinity and pH are required from four (4) sampling points for each summer and winter period. Lead is tested every third 12-month period.

Location Type	*Number of Samples*	*Range of Alkalinity Results Minimum - maximum*	*Range of Lead Results- 2020*	*Number of Exceedances*
		Aesthetic Objective 30-500 Mg/L	Maximum Concentration 10 µg/L	
Distribution	8	170-112 Mg/L	0.02 – 0.73 µg/L	0

Trihalomethanes (THMs) are sampled on a quarterly basis in accordance with O. Reg. 170/03 Schedule 13. The most recent sample results:

Parameter	*Sample Date*	*Result Value*	*Unit of Measure*	*Maximum Allowable Concentration*
THM (NOTE: show latest annual average)	09-Nov-2020	67.50	µg/L	100 µg/L
HAA (NOTE: show latest annual average)	09-Nov-2020	36.54	µg/L	80 µg/L

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

Parameter	*Result Value*	*Unit of Measure*	*Date of Sample*
THM (Rolling Annual Avg.)	Q1 – 56.60	µg/L	6-March-2020
	Q2 – 60.44	µg/L	8-June-2020
	Q3 – 64.96	µg/L	21-Sept-2020
	Q4 – 67.50	µg/L	9-Nov-2020
HAA (Rolling Annual Avg.)	Q2 – 41.17	µg/L	8-June-2020
	Q3 – 36.90	µg/L	21-Sept-2020