Water Operations

Annual Summary Report

~ Innisfil Lake Simcoe Drinking Water System ~

~ Town of Innisfil ~

Reporting Year - 2019

InnServices Utilities Inc.

Innisfil Lake Simcoe Drinking Water System

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 Summary Report for the operations conducted during the 2019 calendar year.

This 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, 2019 to December 31, 2019;
- To provide a status update of the systems capabilities and capacities as of December 31, 2019, and;
- To satisfy the requirements of O. Reg.170/03 Schedule 22

An Annual Report was prepared and submitted to the Ministry of the Environment Conservation and Parks (MECP) for the Innisfil Lake Simcoe Drinking Water System in order to fulfill the requirements of Section 11 of Ontario Regulation 170/03.

The Annual Report identifies specific details regarding the overall quality of the drinking water 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 Summary Report consolidates the information that is required in Section 11 and Schedule 22 of O. Reg. 170/03, and 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 DWWP and MDWL in effect at the end of the reporting period covered in this report are as follows:

DWWP # 120-203, Issue #5 (Issued April 9, 2019)
MDWL # 120-103, Issue #5 (Issued April 9, 2019)

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 # 0130775, issued September 23, 2014 by SAI Global. The Certificate of Accreditation expires September 21, 2020.

Drinking Water System

The System consists of a Surface Water Treatment Plant 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 were:

$109,000	Refurbish Cookstown East Water Tower
$11,000	Goldcrest chlorine board & recirculation pump
$10,800	High lift pump repairs (VFD)
$3,600	Valve repair (BWG transmission line)
$3,300	Strainer waste flow valve
$2,250	Oil filter for compressors at WTP

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	Root Cause/Corrective Action	Corrective Action Date (dd/mm/yy)
Oct. 2, 2019	Total Coliform	1	Cfu/100mL	No root cause identified Resample test	02/10/19
Oct. 29, 2019	E.coli Total Coliform (water main break)	0	Cfu/100mL	Low/no pressure Water Main Break Boil Water advisory Isolate-repair-retest	01/11/19

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	53	0 – 8	0 - 209	n/a	n/a
Treated	53	0 - 0	0 - 0	53	0 - 1
Distribution	668	0 - 0	0 - 1	668	0 - 130

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 2019.

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 2019.

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	0-1.5	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.

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 two (2) incidents of non-compliance related to Continuous Water Quality Monitoring:

Incident Date	Parameter	Result	Unit of Measure	Root Cause/Corrective Action	Corrective Action Date (dd/mm/yy)
June 9, 2019	Operational - Low Chlorine Residual	1.1	Mg/L	Vacuum pump switch failure Isolated WTP, flushed, repaired vacuum switch	10/06/19
Oct. 18, 2019	Log removal not achieved	n/a		Piping failure – Repaired	21/10/19

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). From January 1, 2019 to December 31, 2019, the plant took water from Lake Simcoe under PTTW# 3220-A6HJR4.

Raw water takings for 2019 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 2019.

Table 1: Summary of 2019 Raw Water Takings

	Units	Takings under PTTW # 3220-A6HJR4
PTTW Daily Maximum	(m^3/day)	45,000
Maximum Day	(m^3/day)	18,079
Average Day	(m^3/day)	11,989
Total Annual Takings	(m^3)	4,375,968

System 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 26% of the rated capacity of 45 MLD. At the maximum flow, treated water demand flow in 2019 was 40.7% 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 2019. Zero (0) incidents of non-compliance related to the plant's rated capacity were reported in 2019.

Table 2: Summary of 2019 Treated Water Production

System Rated Capacity (m^3/day)	45,000
Maximum Day (m^3/day)	18,350
Average Day (m^3/day)	11,661
Total Annual Demand (m^3)	4,256,410
System Performance-rated capacity	26%
System Performance – at Maximum Flow	40.7%

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 48**%** of the water produced at ILS WTP was supplied to Bradford-West Gwillimbury (BWG) in 2019

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 2019.

Table 3: Monthly volumes (MLD = 1000 m3) of drinking water directed toward TOI and BWG distribution systems in 2019.

Month	Treated Water Production (MLD)	BWG Use (MLD)	TOI Use (MLD))
January	329.69	158.29	171.40
February	312.63	154.76	157.87
March	319.36	154.31	165.05
April	304.98	128.62	176.36
May	353.17	176.84	176.33
June	364.88	178.58	186.30
July	469.3	229.25	240.05
August	451.85	215.04	236.82
September	352.65	170.56	182.09
October	330.65	163.79	166.86
November	324.30	162.02	162.28
December	342.95	151.51	191.44
Total	4256.41	2043.56	2212.85

MECP Annual Inspection

An Announced Focused inspection was conducted on October 2, 2019 by the Ministry of the Environment Conservation & Parks. The inspection covered the period of October 2, 2018 to September 19, 2019.

Items of Non-compliance
There were five (5) items of non-compliance identified. Four related to water quality monitoring requirements prescribed by legislation were not conducted within the required frequency. Corrective Actions have been taken to ensure sampling occurs within the legislated frequency.
It was also noted that due to significant staffing shortages, the annual report and summary report were not completed by the required deadline.

Provincial Officer's Orders
No Provincial Officer's Orders were issued in the Report as a result of the 2019 inspection.

Inspection Risk Rating
This year the Innisfil Lake Simcoe system received an Inspection Risk Rating of 7.89%, resulting in a Compliance Rating of 92.11%.

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	11-Nov-2019	0.11	µg/L	No
Arsenic	11-Nov-2019	0.4	µg/L	No
Barium	11-Nov-2019	26.1	µg/L	No
Boron	11-Nov-2019	19	µg/L	No
Cadmium	11-Nov-2019	< 0.003	µg/L	No
Chromium	11-Nov-2019	0.26	µg/L	No
Mercury	11-Nov-2019	< 0.01	µg/L	No
Selenium	11-Nov-2019	0.08	µg/L	No
Sodium	14-Dec-2016	27.9	mg/L	Yes
Uranium	11-Nov-2019	0.418	µg/L	No
Fluoride	14-Dec-2016	<0.1	mg/L	No
Nitrite	19-Nov-2019	< 0.003	mg/L	No
Nitrate	19-Nov-2019	0.082	mg/L	No

Parameter	Sample Date (dd/mm/yy)	Result Value	Unit of Measure	Exceedance
Alachlor	11-Nov-2019	<0.02	µg/L	No
Atrazine + N-dealkylated metobolites	11-Nov-2019	<0.01	µg/L	No
Azinphos-methyl	11-Nov-2019	<0.05	µg/L	No
Benzene	11-Nov-2019	<0.32	µg/L	No
Benzo(a)pyrene	11-Nov-2019	<0.004	µg/L	No
Bromoxynil	11-Nov-2019	<0.32	µg/L	No
Carbaryl	11-Nov-2019	<0.05	µg/L	No
Carbofuran	11-Nov-2019	<0.01	µg/L	No
Carbon Tetrachloride	11-Nov-2019	<0.16	µg/L	No
Chlorpyrifos	11-Nov-2019	<0.02	µg/L	No
Diazinon	11-Nov-2019	<0.02	µg/L	No
Dicamba	11-Nov-2019	<0.20	µg/L	No
1,2-Dichlorobenzene	11-Nov-2019	<0.41	µg/L	No
1,4-Dichlorobenzene	11-Nov-2019	<0.36	µg/L	No
1,2-Dichloroethane	11-Nov-2019	<0.35	µg/L	No
1,1-Dichloroethylene (vinylidene chloride)	11-Nov-2019	<0.33	µg/L	No
Dichloromethane	11-Nov-2019	<0.35	µg/L	No
2-4 Dichlorophenol	11-Nov-2019	<0.15	µg/L	No
2,4-Dichlorophenoxy acetic acid (2,4-D)	11-Nov-2019	<0.19	µg/L	No
Diclofop-methyl	11-Nov-2019	<0.40	µg/L	No
Dimethoate	11-Nov-2019	<0.03	µg/L	No
Diquat	11-Nov-2019	<1	µg/L	No

Diuron	11-Nov-2019	<0.03	µg/L	No
Glyphosate	11-Nov-2019	<1	µg/L	No
Malathion	11-Nov-2019	<0.02	µg/L	No
2-Methyl-4-chlorophenoxyacetic acid (MCPA)	11-Nov-2019	<0.12	µg/L	No
Metolachlor	11-Nov-2019	<0.01	µg/L	No
Metribuzin	11-Nov-2019	<0.02	µg/L	No
Monochlorobenzene	11-Nov-2019	<0.3	µg/L	No
Paraquat	11-Nov-2019	<1	µg/L	No
Pentachlorophenol	11-Nov-2019	<0.15	µg/L	No
Phorate	11-Nov-2019	<0.01	µg/L	No
Picloram	11-Nov-2019	<1	µg/L	No
Polychlorinated Biphenyls(PCB)	11-Nov-2019	<0.04	µg/L	No
Prometryne	11-Nov-2019	<0.03	µg/L	No
Simazine	11-Nov-2019	<0.01	µg/L	No
Terbufos	11-Nov-2019	<0.01	µg/L	No
Tetrachloroethylene	11-Nov-2019	<0.35	µg/L	No
2,3,4,6-Tetrachlorophenol	11-Nov-2019	<0.20	µg/L	No
Triallate	11-Nov-2019	<0.01	µg/L	No
Trichloroethylene	11-Nov-2019	<0.44	µg/L	No
2,4,6-Trichlorophenol	11-Nov-2019	<0.25	µg/L	No
Trifluralin	11-Nov-2019	<0.02	µg/L	No
Vinyl Chloride	11-Nov-2019	<0.17	µg/L	No

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			
Sodium	27.9	Mg/L	14 Dec 2016

Distribution Sampling (Lead, THM and HAA)

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 Lead Results * (min#) – (max #)	Unit of Measure	Number of Exceedances
Plumbing	N/A	N/A	N/A	N/A
Distribution (Alkalinity only)	8	103-117	Mg/L	None

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	Exceedance
THM (NOTE: show latest annual average)	Nov. 18, 2019	54.67	µg/L	No

HAA (NOTE: show latest annual average)	Nov. 18, 2019	35.03	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. (Lead and THM)

Parameter	Result Value	Unit of Measure	Date of Sample
THM (Rolling Annual Avg.)	54.67	µg/L	18-Nov-2019