



Ontario Clean Water Agency Agence Ontarienne Des Eaux

New Liskeard Drinking Water System

2019 ANNUAL/SUMMARY REPORT

Prepared by the Ontario Clean Water Agency on behalf of the City of Temiskaming Shores

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INTRODUCTION

Municipalities throughout Ontario are required to comply with Ontario Regulation 170/03 made under the *Safe Drinking Water Act* (SDWA) since June 2003. The Act was passed following recommendations made by Commissioner O'Conner after the Walkerton Inquiry. The Act's purpose is to protect human health through the control and regulation of drinking-water systems. O. Reg. 170/03 regulates drinking water testing, use of licensed laboratories, treatment requirements and reporting requirements.

Section 11 of Regulation 170/03 requires the owner to produce an Annual Report. This report must include the following:

- 1. Description of system & chemical(s) used
- 2. Summary of any adverse water quality reports and corrective actions
- 3. Summary of all required testing
- 4. Description of any major expenses incurred to install, repair or replace equipment

This Annual Report must be completed by February 28 of each year.

The regulation also requires a Summary Report which must be presented and accepted by Council by March 31 of each year for the preceding calendar year reporting period.

The report must list the requirements of the Act, its regulations, the system's Drinking Water Works Permit (DWWP), Municipal Drinking Water Licence (MDWL), Certificate of Approval (if applicable), and any regulatory requirement the system failed to meet during the reporting period. The report must also specify the duration of the failure, and for each failure referred to, describe the measures that were taken to correct the failure.

The *Safe Drinking Water Act,* 2002 and the drinking water regulations can be viewed at the following website: <u>http://www.e-laws.gov.on.ca</u>.

To enable the Owner to assess the rated capacity of their system to meet existing and future planned water uses, the following information is also required in the report.

- 1. A summary of the quantities and flow rates of water supplied during the reporting period, including the monthly average and the maximum daily flows.
- 2. A comparison of the summary to the rated capacity and flow rates approved in the systems approval, drinking water works permit or municipal drinking water licence or a written agreement if the system is receiving all its water from another system under an agreement.

The reports have been prepared by the Ontario Clean Water Agency (OCWA) on behalf of the Owner and presented to council as the 2019 Annual/Summary Report.

New Liskeard Drinking Water System

Section 11 2019 ANNUAL REPORT

Section 11 - ANNUAL REPORT

1.0 INTRODUCTION

Drinking-Water System Name	New Liskeard Drinking Water System
Drinking-Water System Number	220000344
Drinking-Water System Owner	The Corporation of the City of Temiskaming Shores
Drinking-Water System Category	Large Municipal, Residential System
Reporting Period	January 1, 2019 to December 31, 2019

Does your Drinking-Water System serve more than 10,000 people? No

Is your annual report available to the public at no charge on a web site on the Internet? Yes at: <u>http://www.temiskamingshores.ca/en/index.asp</u>

Location where the report required under O. Reg. 170/03 Schedule 22 will be available for inspection:

City of Temiskaming Shores 325 Farr Drive, P.O. Box 2050 Haileybury, ON POJ 1K0

Drinking-Water Systems that receive drinking water from the New Liskeard Drinking Water System

The New Liskeard Drinking Water System provides all of its drinking water to the communities of New Liskeard and Dymond within the City of Temiskaming Shores.

The Annual Report was not provided to any other Drinking Water System Owners

The Ontario Clean Water Agency prepared the 2019 Annual Report for the New Liskeard Drinking Water System and provided a copy to the system owner; the City of Temiskaming Shores. The New Liskeard Drinking Water System is a stand-alone system that does not receive water from or send water to another system.

Notification to system users that the Annual Report is available for viewing is accomplished through:

Public access/notice via the web Public access/notice via City's Facebook page Public access/notice via a community bulletin

2.0 NEW LISKEARD DRINKING WATER SYSTEM (DWS No. 220000344)

The New Liskeard Drinking Water System is owned by The Corporation of the City of Temiskaming Shores and consists of a Class 1 water treatment system and a Class 3 water distribution subsystem. The system is a communal ground water well supply that services the communities of New Liskeard and Dymond. The Ontario Clean Water Agency is the accredited operating authority and is designated as the Overall Responsible Operator for both the water treatment and water distribution facilities.

Raw Water Supply

The New Liskeard water treatment plant, located at 301 McCamus and is supplied by two main production wells; Well 3 and Well 4. Well 3 is a 54.9 m deep drilled well equipped with a vertical turbine pump rated at 2700 L/min. The well is housed in a secure building located directly across from the water plant. Well 4 is a 54.9 m deep drilled well also equipped with a vertical turbine pump rated at 2700 L/min. This well is located inside the water treatment plant building. There is approximately 23 m of low permeability clay between the ground surface and the aquifer protecting the groundwater from surface spills.

Water Treatment

The production wells feed the main water treatment plant that has a maximum rated capacity of 7865 cubic meters per day (m^3/d) .

The treatment process consists of two iron and manganese removal/pressure filtration systems rated at 94.6 L/s that are filled with Filtronic's Electromedia[®], a proprietary media. The configuration allows either filter to be supplied with raw water from either of the two wells and the filter effluent is continuously monitored for turbidity. The two pressurized filters are automatically backwashed, based on high filter turbidity or maximum filter runtime. Manual backwashes can also be initiated when required. The backwash wastewater is discharged into the municipal sanitary sewage system which flows into the New Liskeard Lagoon.

Prior to filtration, chlorine gas is injected into the water to aid the oxidation process and precipitate the iron and manganese. After filtration, the treated water is re-chlorinated and directed into a contact tank comprised of two clearwells.

Water Storage and Pumping Capabilities

The clearwells are located directly below the water treatment plant and have a total storage capacity of 271 m³. The baffles in the clearwell help to ensure sufficient chlorine contact time (CT). This is continuously monitored by a chlorine analyzer to ensure adequate primary disinfection before water enters the distribution system. The two clearwells are connected via an isolation valve to enable either clearwell to be drained for maintenance without compromising a continuous supply of water to users.

Two vertical turbine high lift pumps, equipped with variable frequency drives (VFDs) are each rated at 3272 L/min. They direct the treated water from the clear well to the Shepherdson Road reservoir and the Dymond reservoirs. If the high lifts are off then the Dymond Reservoir is fed by the Shepherdson Road reservoir.

The Shepherdson Road reservoir has a storage capacity of 1818 m³. Three vertical turbine pumps, all equipped with variable frequency drives (VFDs), supply water to pressure zones 2 and 3 in the system. A secondary disinfection system is in place at the reservoir using sodium hypochlorite to boost the chlorine levels leaving the reservoir if required.

The Dymond Reservoir is located at 284 Raymond Street and has a capacity of 1395 m³. The reservoir is a single story building with an underground clearwell consisting of four interconnected baffled cells. The building houses a sodium hypochlorite feed system, if boosting is required and four vertical turbine pumps (equipped with VFDs) two rated at 70 L/s and two rated at 28.1 L/s.

Emergency Power

An emergency 300 KW stand-by power generator is available at the Well 3 pumphouse to ensure continued operation of the water supply treatment and facility during a power outage. A 230 kW diesel generator is on-site at the Shepherdson Street Reservoir and a 260 kW standby diesel generator is available at the Dymond Reservoir in case of power failures.

Distribution System

The New Liskeard Drinking Water System is classified as a Large Municipal Residential Drinking Water System that provides water to the communities of New Liskeard and Dymond which consists of approximately 5750 residents and 2300 service connections.

This distribution system is broken down into three (3) service zones. It should be noted that the feeder main from the McCamus water treatment plant to the storage reservoir on Shepherdson Road also acts as a distribution line within Zone I. The three zones are supplied with potable water in the following manner:

Zone I – Gravity Zone is supplied with water through a distribution line (also the feeder main to the reservoir from the WTP) from the Shepherdson Road reservoir. Zone I is also isolated from Zones II and III via natural topography and closed valves. Zone I also supplies water from Shepherdson Road to the Dymond Reservoir which feeds the Dymond Distribution System.

Zone II – Intermediate Zone is fed through a separate distribution line from the Shepherdson Road reservoir through pumping. The area is generally comprised of residential units as well as the recently developed (2011) Dymond Industrial Park. The interconnected distribution piping between this zone and Zone I (gravity) is isolated via closed gate valves. Zone III – High Zone is fed through a separate distribution line from the Shepherdson Road reservoir through pumping. The area is generally comprised of limited industrial users and is the main feed for Temiskaming Hospital.

3.0 LIST OF WATER TREATMENT CHEMICALS USED OVER THE REPORTING PERIOD

The following chemicals were used in the New Liskeard Drinking Water System treatment process:

Chlorine Gas – Primary Disinfection Sodium Hypochlorite – Secondary Disinfection

All treatment chemicals meet AWWA and NSF/ANSI standards.

4.0 SIGNIFICANT EXPENSES INCURRED TO THE DRINKING WATER SYSTEM

OCWA is committed to maintaining the assets of the drinking water system and sustains a program of scheduled inspection and maintenance activities using a computerized Work Management System (WMS).

Significant expenses incurred in the drinking water system include the following:

Water Treatment Plant

- Replaced two faulty turbidimeters with new units
- Installed a valve port in pressure supply line for pressure calibrator access
- Replaced milltronics level transmitter in the pump chamber
- Replaced intrusion alarm keypad.

Shepherson Street Pumping Station

• Replaced UPS at the New Liskeard

Dymond Pumping Station

- Repaired vent screens at the Dymond Reservoir (MECP recommendation)
- Repaired crumbing roof

Distribution System

- Watermain extension and installation of 181 meters of 150 mm diameter watermain, 17 residential service connections and 1 fire hydrant to a new residential development known as Rivard Court
- Replaced approxiumetely 22.5 meters of 150 mm watermain with PVC and 2 gate valves at the intersection of Paget Street & Whitewood Avenue.

5.0 DETAILS ON NOTICES OF ADVERSE TEST RESULTS AND OTHER PROBLEMS REPORTED TO & SUBMITTED TO THE SPILLS ACTION CENTER

Based on information kept on record by OCWA, one (1) adverse water quality incident was reported to the Ministry's Spills Action Centre in 2019.

AWQI 145309 – <u>Boil Water Advisory (BWA) during Category 2 Watermain Break/Repair</u>, *May* 2, 2019 at approx. 0800 hours - The City was conducting a valve replacement when the shoring caved in on exposed piping resulting in a category 2 watermain break. The local health unit was notified and issued a boil water advisory (BWA). The ministry's Spills Action Center (SAC) and the local MECP inspector were also notified. The repair, disinfection and flushing were completed by the City. Two sets of three bacteriological samples (upstream, downstream and at site) were collected 24 hours apart and results were acceptable (zero total coliforms or *E.coli*). The BWA was lifted on Saturday, May 4th at approximately 1200 hours. Resolution report submitted May 6th.

6.0 MICROBIOLOGICAL TESTING PERFORMED DURING THE REPORTING PERIOD

Sample Type # of Ram Samples		Range of E.coli Results (min to max)	Range of Total Coliform Results (min to max)	# of HPC Samples	Range of HPC Results (min to max)
Raw – Well 3	53	0 to 0	0 to 4	N/A	N/A
Raw – Well 4	53	0 to 0	0 to 0	N/A	N/A
Treated	53	0 to 0	0 to 0	53	< 10 to 100
Distribution	212	0 to 0	0 to 0	106	< 10 to 130

Summary of Microbiological Data

Maximum Acceptable Concentration (MAC) for *E. coli* = 0 Counts/100 mL

MAC for Total Coliforms = 0 Counts/100 mL

INT - interference, bacti colonies cannot be properly counted

NDOGN - no data, overgrown with non-target

Notes:

 One microbiological sample is collected and tested each week from the raw and treated water supply. A total of four microbiological samples are collected and tested each week from the New Liskeard distribution system. At least 25% of the distribution samples are tested for HPC bacteria.

Refer to <u>Appendix A</u> for a monthly summary of microbiological test results.

7.0 OPERATIONAL TESTING PERFORMED DURING THE REPORTING PERIOD

Summary Of Naw Wate	Summary of New Water Fulblandy Data								
Parameter	Number of Samples	Range of Results	Unit of Measure						
		(min to max)							
Turbidity – Well 3	52	0.10 to 0.98	NTU						
Turbidity – Well 4	52	0.15 to 1.10	NTU						

Summary of Raw Water Turbidity Data

Notes:

- 1. Turbidity samplesre required once every month.
- 2. Well No. 3 taken off-line during plant upgrade. High turbidity results caused when the well was started up to collect regulatory bacteriological and turbidity samples.

Continuous Monitoring in the Treatment Process

Parameter	# of Samples	Range of Results (min to max)	Unit of Measure	Standard
Free Chorine Residual	8760	0.56 to 5.04	mg/L	СТ

Notes:

- 1. For continuous monitors use 8760 as the number samples for one year
- 2. CT is the concentration of chlorine in the water times the time of contact that the chlorine has with the water. It is used to demonstrate the level of disinfection treatment in the water. CT calculations are performed for the New Liskeard water plant if the free chlorine residual level drops below 0.40 mg/L to ensure primary disinfection is achieved.

Summary of Chlorine Residual Data in the Distribution System

Number of Samples Free Chlorine		Unit of Measure	Standard
365	0.10 to 1.67	mg/L	≥ 0.05
		6,	

Note: Four (4) chlorine residual samples are collected one day and three (3) on a second day of each week. The sample sets must be collected at least 48-hours apart and samples collected on the same day must be from different locations.

Summary of Nitrate & Nitrite Data (sampled at the plant's point of entry into the distribution every quarter)

, , ,		1 1 1	,	, , ,
Date of Sample	Nitrate Result	Nitrite Result	Unit of Measure	Exceedance
January 8	< 0.02	< 0.008	mg/L	No
April 8	< 0.05	< 0.05	mg/L	No
July 8	< 0.05	< 0.05	mg/L	No
October 7	< 0.05	< 0.05	mg/L	No

Maximum Allowable Concentration (MAC) for Nitrate = 10 mg/L MAC for Nitrite = 1 mg/L

Summary of Total Trihalomethane Data (sampled in the distribution system every quarter)

Date of Sample	THM Result	Unit of Measure	Running Average	Exceedance		
January 8	48.6	ug/L				
 April 8	43.8	ug/L	46.2	No		
 July 8	45.7	ug/L	40.2	INO		
 October 7	46.6	ug/L	-			

Maximum Allowable Concentration (MAC) for Total Trihalomethanes = 100 ug/L (Four Quarter Running Average)

Haloacetic Acid (HAAs) Sampling and Testing Required under Schedule 13-6.1

New sampling requirements for Haloacetic Acids (HAAs) came into effect on January 1st, 2017. At least one distribution sample must be taken in each calendar quarter, from a point in the drinking water system's distribution system, or plumbing that is likely to have an elevated potential for the formation of HAAs. Over the past three years, samples were collected near the plant, in the middle of the distribution system and at the end of the distribution system as per guidance provided in a Ministry's letter "HAA Concerns" dated May 9, 2018. The sample location with the highest concentration of HAAs is Ebert Welding (883275 Hwy 65E) at the end of the system.

The maximum allowable concentration (MAC) of 80 ug/L is effective January 1st, 2020 and is based on a running annual average of quarterly results (similar to THMs). Results that exceed the MAC must be reported as an adverse water quality incident (AWQI) starting January 1st, 2020. HAA results for 2019 are summarized below.

 	•	•			
Date of Sample	Result Value	Unit of Measure	Running Average	Exceedance	
 January 8	29	ug/L			
 April 8	< 8	ug/L	- 19 2	NI / A	
 July 8	28	ug/L	- < 18.3	N/A	
October 7	8	ug/L	_		

Summary of Total Haloacetic Acid Data (sampled in the distribution system)

Summary of Most Recent Lead Data under Schedule 15.1

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

The New Liskeard Drinking Water System qualified for the 'Exemption from Plumbing Sampling' as described in section 15.1-5 (9-10) of Ontario Regulation 170/03. The exemption applies to a drinking water system if; in two consecutive periods at reduced sampling, not more than 10% of all samples from plumbing exceed the maximum allowable concentration of 10 ug/L for lead. As such, the system was required to test for total alkalinity and pH in three distribution samples collected during the periods of December 15 to April 15 (winter period) and June 15 to October 15 (summer period). This testing is required in every 12-month period with lead testing in every third 12-month period.

Two rounds of alkalinity and pH testing were carried out on April 4th and October 7th of 2019. Results are summarized in the table below.

Date of Sample	# of Samples	Field pH (min to max)	Field Temperature ([°] C) (min to max)	Alkalinity (mg/L) (min to max)	Lead (ug/L) (min to max)
April 4	3	7.40 to 7.40	2.0 to 5.4	233 to 234	N/A
October 7	3	7.34 to 7.42	11.7 to 14.2	225 to 232	N/A

Summary of Lead Data (sampled in the distribution system)

Note: Next lead sampling scheduled for 2021

Parameter	Result Value	Unit of Measure	MAC	MAC Exceedance	1/2 MAC Exceedance
Antimony	< 0.5	ug/L	6	No	No
Arsenic	< 1	ug/L	10	No	No
Barium	108	ug/L	1000	No	No
Boron	116	ug/L	5000	No	No
Cadmium	< 0.1	ug/L	5	No	No
Chromium	< 1	ug/L	50	No	No
Mercury	< 0.1	ug/L	1	No	No
Selenium	< 1	ug/L	50	No	No
Uranium	< 1	ug/L	20	No	No

Most Recent Schedule 23 Inorganic Data Tested at the Water Treatment Plant

Note: Sample required every 36 months (sample date = *October10, 2017*). Next sampling scheduled for October 2020

Most Recent Schedule 24 Organic Data Tested at the Water Treatment Plant

Parameter	Result Value	Unit of Measure	ΜΔΟ	MAC	½ MAC
ralameter	Result value	onit of Weasure	MAC	Exceedance	Exceedance
Alachlor	< 0.2	ug/L	5	No	No
Atrazine + N-dealkylated metobolites	< 0.5	ug/L	5	No	No
Azinphos-methyl	< 0.2	ug/L	20	No	No
Benzene	< 0.1	ug/L	1	No	No
Benzo(a)pyrene	< 0.005	ug/L	0.01	No	No
Bromoxynil	< 0.09	ug/L	5	No	No
Carbaryl	< 1	ug/L	90	No	No
Carbofuran	< 1	ug/L	90	No	No
Carbon Tetrachloride	< 0.2	ug/L	2	No	No
Chlorpyrifos	< 0.2	ug/L	90	No	No
Diazinon	< 0.2	ug/L	20	No	No
Dicamba	< 0.08	ug/L	120	No	No
1,2-Dichlorobenzene	< 0.2	ug/L	200	No	No
1,4-Dichlorobenzene	< 0.3	ug/L	5	No	No
1,2-Dichloroethane	< 0.2	ug/L	5	No	No
1,1-Dichloroethylene (vinylidene chloride)	< 0.3	ug/L	14	No	No
Dichloromethane	< 1	ug/L	50	No	No
2-4 Dichlorophenol	< 0.2	ug/L	900	No	No
2,4-Dichlorophenoxy acetic acid (2,4-D)	< 0.08	ug/L	100	No	No
Diclofop-methyl	< 0.08	ug/L	9	No	No
Dimethoate	< 0.2	ug/L	20	No	No
Diquat	< 0.6	ug/L	70	No	No
Diuron	< 6	ug/L	150	No	No
Glyphosate	< 20	ug/L	280	No	No
МСРА	< 10	ug/L	100	No	No

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Parameter	Result Value	Unit of Measure	MAC	MAC Exceedance	½ MAC Exceedance
Malathion	< 0.2	ug/L	190	No	No
Metolachlor	< 0.1	ug/L	50	No	No
Metribuzin	< 0.1	ug/L	80	No	No
Monochlorobenzene	< 0.5	ug/L	80	No	No
Paraquat	< 0.3	ug/L	10	No	No
Pentachlorophenol	< 0.3	ug/L	60	No	No
Phorate	< 0.1	ug/L	2	No	No
Picloram	< 0.08	ug/L	190	No	No
Polychlorinated Biphenyls (PCBs)	< 0.06	ug/L	3	No	No
Prometryne	< 0.06	ug/L	1	No	No
Simazine	< 0.2	ug/L	10	No	No
Terbufos	< 0.1	ug/L	1	No	No
Tetrachloroethylene	< 0.3	ug/L	10	No	No
2,3,4,6-Tetrachlorophenol	< 0.3	ug/L	100	No	No
Triallate	< 0.1	ug/L	230	No	No
Trichloroethylene	< 0.2	ug/L	5	No	No
2,4,6-Trichlorophenol	< 0.2	ug/L	5	No	No
Trifluralin	< 0.1	ug/L	45	No	No
Vinyl Chloride	< 0.1	ug/L	1	No	No

Nost Recent Schedule 24 Org	anic Data Tested at the	Water Treatment Plant
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Note: Sample required every 36 months (sample date = October 10, 2017). Next sampling scheduled for October 2020

Inorganic or Organic Parameter(s) that Exceeded Half the Standard Prescribed in Schedule 2 of Ontario Drinking Water Quality Standards

No inorganic or organic parameter(s) listed in Schedule 23 and 24 of Ontario Regulation 170/03 exceeded half the standard found in Schedule 2 of the Ontario Drinking Water Standard (O. Reg.169/03) during the reporting period.

Most Recent Sodium Data at the Water Treatment Plant

Date of Sample	# of Samples	Result Value	Unit of Measure	Standard	Exceedance
October 9, 2018	1	14.7	mg/L	20	Yes

Note: Sample required every 60 months. Next sampling scheduled for October 2023.

Most Recent Fluoride Data at the Water Treatment Plant

Date of Sample	# of Samples	Result Value	Unit of Measure	Standard	Exceedance	
October 9, 2018	1	0.718	mg/L	1.5	No	

Note: Sample required every 60 months. Next sampling scheduled for October 2023.

Additional Testing Performed in Accordance with a Legal Instrument

Schedule D, Section 2.0 of Municipal Drinking Water Licence #218-103 issued on August 15, 2016 provides relief from regulatory requirements Schedule 1-2(2) and 16-3(1)4 which states that:

Notwithstanding the provisions of Ontario Reg. 170/03, the Owner is not required to comply with the following:

- The free chlorine residual at 399 Radley Hill Road is never less than 0.05 mg/L.
- A result indicating that the free chlorine residual is less than 0.05 mg/L in a sample of drinking water at 399 Radley Hill Road is an adverse result of a drinking water test for the purpose of section 18 of the Ontario Safe Drinking Water Act (SDWA, 2002) if a report under subsection 18(1) of the SDWA has not been made in respect of free chlorine residual in the preceding 24 hours.

In exchange, the following conditions apply:

- An ultraviolet light (UV) point of entry treatment unit owned or leased by the owner of the system is connected to the plumbing of every building and other structure that is served by the drinking water system at 399 Radley Hill Road.
- The UV unit(s) is validated through biodosimetry testing for a dose of 40 mJ/cm².
- In the event that the UV unit malfunctions, loses power or ceases to provide the appropriate level of disinfection:

- The UV unit has a feature that ensures that no water is directed to users of water treated by the unit and a certified operator takes appropriate action at the location where the unit is installed if such an event occurs before water is again directed to users of water treated by the unit, or

- The UV unit has a feature that causes an alarm to sound immediately at the building or structure where the point of entry treatment unit is installed and a location where a certified operator is present, if a certified operator is not always present at the building or structure where the point of entry treatment unit is installed. If an alarm sounds, a certified operator must take appropriate action as soon as possible.

Ultraviolet Dosage

UV System	# of Samples	Range of Results (min to max)	Unit of Measure	Limit	
UV Unit	97	209.9 to 401.7	mJ/cm ²	40	

New Liskeard Drinking Water System

Schedule 22 2019 SUMMARY REPORT FOR MUNICIPALITIES

Schedule 22 - SUMMARY REPORTS FOR MUNICIPALITIES

1.0 INTRODUCTION

Drinking-Water System Name Municipal Drinking Water Licence (MDWL) Drinking Water Works Permit (DWWP) Permit to Take Water (PTTW) Reporting Period

New Liskeard Drinking Water System 218-103-2 (issued August 15, 2016) 218-203-3 (issued April 21, 2017) 4417-AF2JAM (issued November 2, 2016) January 1, 2019 to December 31, 2019

2.0 REQUIREMENTS THE SYSTEM FAILED TO MEET

According to information kept on record by OCWA, the New Liskeard Drinking Water System failed to meet the following requirements during the 2019 reporting period:

Drinking Water	Requirement(s) the System	Duration	Corrective Action(s)	Status
Legislation	Failed to Meet	Duration	conective Action(s)	Status
Section 27(5)5	On two occasions during the	December 4,	The operating authority	Complete
of O.Reg.	inspection period the continuous	2018 from	provided training to all	
128/04.	trends in the SCADA system did not	8:10pm to	operators on December 18th,	
	record data and the trends appear	8:45pm and	2019.	
	to flatline. The data was available in			
	the Field Data Manager. However,	October 15,		
	there were no records made of the	2019 from		
	abnormal observations (ie. flatlines)	8:47am to		
	by the operator conducting the 72	1:19pm		
	hour review or indication that the			
	Field Data Manager had been			
	reviewed to confirm disinfection as			
	required by the regulation.			

It should also be mentioned that, one (1) adverse water quality incident was reported to the Ministry's Spills Action Center during a watermain break. Refer to Section 5.0 – Details on Notices of Adverse Test Results and Other Problems Reported to & Submitted to the Spills Actions Center on page 7 of this report for details.

3.0 SUMMARY OF QUANTITIES & FLOW RATES

Flow Monitoring

Municipal Drinking Water Licence (MDWL) #218-103 requires the owner to install a sufficient number of flow measuring devices to permit the continuous measurement and recording of:

• the flow rate and daily volume of water conveyed from the treatment system to the distribution system, and



• the flow rate and daily volume of water conveyed into the treatment system.

The flow monitoring equipment identified in the MDWL is present and operating as required. These flow meters are calibrated on an annual basis as specified in the manufacturers' instructions.

Water Usage

The following Water Usage Tables summarize the quantities and flow rates of water taken and produced during the 2019 reporting period, including average monthly volumes, maximum monthly volumes, total monthly volumes and maximum flow rates.

Raw Water

2019 - Monthly Summary of Water Takings from the Source (Well No. 3 and Well No. 4)

Regulated by Permit to Take Water (PTTW) #4417-AF2JAM, issued November 2, 2016

Well No. 3

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year to Date
Total Volume (m ³)	47147	44994	45631	40243	53029	58221	71476	56742	43452	40851	39184	40254	581224
Average Volume (m³/d)	1521	1607	1472	1341	1711	1941	2306	1830	1448	1318	1306	1299	1592
Maximum Volume (m³/d)	1986	2364	2033	1726	2249	2431	2962	2531	2023	2005	1551	2227	2962
PTTW - Maximum Allowable Volume (m ³ /day)	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
Maximum Flow Rate (L/min)	3769	4006	3772	3800	3817	3877	3721	3796	3670	3730	3736	3911	4006
PTTW - Maximum Allowable Flow Rate (L/min)	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500

Well No. 4

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year to Date
Total Volume (m ³)	48482	44836	49124	51012	52965	42921	71706	60302	48113	42653	40647	42489	595250
Average Volume (m³/d)	1564	1601	1585	1700	1709	1431	2313	1945	1604	1376	1355	1371	1629
Maximum Volume (m³/d)	2005	2049	1984	2490	2110	2741	3165	2612	2137	1769	1887	1801	3165
PTTW - Maximum Allowable Volume (m ³ /day)	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
Maximum Flow Rate (L/min)	2941	2956	2925	2893	2916	2945	2884	2887	2846	2771	2768	2690	2956
PTTW - Maximum Allowable Flow Rate (L/min)	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year to Date
Total Volume (m ³)	95629	89830	94754	91255	105994	101142	143182	116043	91553	83494	79831	82743	1175451
Average Volume (m ³ /d)	3085	3208	3057	3042	3419	3371	4619	3743	3052	2693	2661	2669	3218
Maximum Volume (m³/d)	3581	4413	3501	3295	4017	3906	5464	4651	3415	3354	2993	2937	5464
MDWL - Rated Capacity (m ³ /day)	8000	8000	8000	8000	8000	8000	8000	8000	8000	8000	8000	8000	8000

Combined Raw Water Taking (Well No. 3 and Well No. 4)

The system's Permit to Take Water #4417-AF2JAM, issued November 2, 2016, allows the City to withdraw water at the following rates:

Well No. 3:	$4000 \text{ m}^3/\text{day}$	4,500 L/minute
Well No. 4:	$4000 \text{ m}^3/\text{day}$	4,500 L/minute
Total Combined Daily Volume:	$8000 \text{ m}^3/\text{day}$	

A review of the raw water flow data indicates that the wells did not exceed the maximum allowable volumes or maximum flow rates during the reporting period.

Treated Water

Treated Water Usage

2019 - Monthly Summary of Treated Water Supplied to the Distribution System

Regulated by Municipal Drinking Water Licence (MDWL) #218-103 - Issue 2, dated August 15, 2016

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Dat	to te
Total Volume (m ³)	90092	84719	89139	85976	100161	96592	132046	112268	86331	78578	75161	77857	11089	919
Average Volume (m³/d)	2906	3026	2875	2866	3231	3220	4260	3622	2878	2535	2505	2512	303	36
Maximum Volume (m³/d)	3397	4236	3332	3087	3578	3682	6112	4521	3208	3163	2821	2769	611	2
MDWL - Rated Capacity (m ³ /day)	7865	7865	7865	7865	7865	7865	7865	7865	7865	7865	7865	7865	786	35

Schedule C, Section 1.0 (1.1) of MDWL No. 218-103 states that the maximum daily volume of treated water that flows from the treatment subsystem to the distribution system shall not exceed 7865 m^3 on any calendar day. The New Liskeard DWS complied with this limit having a recorded maximum volume of 6112 m^3 /day in July, which represents 77.7 % of the rated capacity.

The following table and graph (Figure 1) compares the average and maximum flow rates into the distribution system to the approved rated capacity of the system as identified in the MDWL.

Dec
2512
2769
7865
35

Figure 1: 2019 - Monthly Volume of Treated Water into the Distribution System



Summary of System Performance

The following information is provided to enable the Owner to assess the capability of the system to meet existing and future water usage needs:

Rated Capacity of the Plant (MDWL)	7865 m³/day	
Average Daily Flow for 2019	3036 m ³ /day	38.6 % of the rated capacity
Maximum Daily Flow for 2019	6112 m ³ /day	77.7 % of the rated capacity
Total Treated Water Produced in 2019	1,108,919 m ³	

CONCLUSION

The New Liskeard Drinking Water System operated well in 2019 complying with the regulatory requirements outlined in its site specific drinking water works permit and municipal drinking water licence having no incidents of non-compliance during the reporting period.

The system was able to operate within the water taking limits of the permit and in accordance with the rated capacity of the licence while meeting the community's demand for water use.

The system addressed the following non-compliance with Ontario Regulation 128/04

No comments were documented during the 72 hour review when the SCADA system did not record data on two occasions during the reporting period. Training on reviewing trends was provided to all operators on December 18, 2019.

APPENDIX A

Monthly Summary of Microbiological Test Results

NEW LISKEARD DRINKING WATER SYSTEM 2019 SUMMARY OF MICROBIOLOGICAL TEST RESULTS

Facility Works Number:	220000344
Facility Owner:	Municipality: City of Temiskaming Shores
Facility Classification:	Class 1 Water Treatment

RAW WATER	01/2019	02/2019	03/2019	04/2019	05/2019	06/2019	07/2019	08/2019	09/2019	10/2019	11/2019	12/2019	Total	Avg	Max	Min
Well 3 / Total Coliform: TC - cfu/100mL																
Count Lab	5	4	4	5	4	4	5	4	5	4	4	5	53		1	
Max Lab Mean Lab	0	0	0	0	0	0	0	0	0	1.5	0.5	0		0.151	4	
Min Lab	0	0	0	0	0	0	0	0	0	0	0	0				0
Well 3 / E. Coli: EC - cfu/100mL																
Count Lab	5	4	4	5	4	4	5	4	5	4	4	5	53			
Max Lab Mean Lab	0	0	0	0	0	0	0	0	0	0	0	0		0	0	
Min Lab	0	0	0	0	0	0	0	0	0	0	0	0		0		0
Well 4 / Total Coliform: TC - cfu/100mL		-														
Count Lab	5	4	4	5	4	4	5	4	5	4	4	5	53			
Max Lab	0	0	0	0	0	0	0	0	0	0	0	0			0	
Mean Lab	0	0	0	0	0	0	0	0	0	0	0	0		0		
Win Lab Well 4 / E. Coli: EC - cfu/100ml	0	0	0	0	0	0	0	0	0	0	0	0				0
Count Lab	5	4	4	5	4	4	5	4	5	4	4	5	53			
Max Lab	0	0	0	0	0	0	0	0	0	0	0	0			0	
Mean Lab	0	0	0	0	0	0	0	0	0	0	0	0		0		
Min Lab	0	0	0	0	0	0	0	0	0	0	0	0				0
	01/2010	00/2040	02/2040	04/2040	05/2010	00/2010	07/0040	00/2010	00/2010	10/2010	44/2040	10/0010	Tatal	A	Max	Min
TREATED WATER	01/2019	02/2019	03/2019	04/2019	05/2019	06/2019	07/2019	08/2019	09/2019	10/2019	11/2019	12/2019	lotal	AVg		IVIIN
Count Lab	5	4	4	5	4	4	5	4	5	4	4	5	53			
Max Lab	0	0	0	0	0	0	0	0	0	0	0	0			0	
Mean Lab	0	0	0	0	0	0	0	0	0	0	0	0		0		
Min Lab	0	0	0	0	0	0	0	0	0	0	0	0				0
Treated Water POE / E. Coli: EC - cfu/100mL						<u> </u>		+ +								
Count Lab Max Lab	5	4	4	5	4	4	5	4	5	4	4	5	53	+		
Mean Lab	0	0	0	0	0	0	0	0	0	0	0	0		0		
Min Lab	0	0	0	0	0	0	0	0	0	0	0	0				0
Treated Water POE / HPC - cfu/mL																
Count Lab	5	4	4	5	4	4	5	4	5	4	4	5	53			
Max Lab	< 10	< 100	< 10 <	: 10 <	10	< 10	< 10	< 10 <	< 10 <	< 30 <	< 10	< 10		40.075	100	
Mean Lab Min Lab	< 10	< 32.5	< 10 <	< 10 <	10	< 10	< 10	< 10 <	< 10 <		< 10	< 10	<	12.075		10
	< 10	< 10			10	< 10						< 10				10
	01/2019	02/2019	03/2019	04/2019	05/2019	06/2019	07/2019	08/2019	09/2019	10/2019	11/2019	12/2019	Total	Avg	Max	Min
1st Bacti/Residual / Total Coliform: TC - cfu/100mL																
Count Lab	5	4	4	5	4	4	5	4	5	4	4	5	53			
Max Lab	0	0	0	0	0	0	0	0	0	0	0	0			0	
Mean Lab	0	0	0	0	0	0	0	0	0	0	0	0		0		0
Min Lab 1st Bacti/Residual / E. Coli - cfu/100ml	0	0	0	0	0	0	0	0	0	0	0	0				0
Count Lab	5	4	4	5	4	4	5	4	5	4	4	5	53			
Max Lab	0	0	0	0	0	0	0	0	0	0	0	0			0	
Mean Lab	0	0	0	0	0	0	0	0	0	0	0	0		0		
Min Lab	0	0	0	0	0	0	0	0	0	0	0	0				0
2nd Bacti/Residual / Total Coliform: TC - cfu/100ml																
Count Lab	5	4	4	5	4	4	5	4	5	4	4	5	53			
Max Lab	0	0	0	0	0	0	0	0	0	0	0	0			0	
Mean Lab	0	0	0	0	0	0	0	0	0	0	0	0		0		
Min Lab	0	0	0	0	0	0	0	0	0	0	0	0				0
2nd Bacti/Residual / E. Coli - cfu/100mL								1					50			
Count Lab Max Lab	5	4	4	5	4	4	5	4	5	4	4	5	53		0	
Mean Lab	0	0	0	0	0	0	0	0	0	0	0	0		0		
Min Lab	0	0	0	0	0	0	0	0	0	0	0	0				0
2nd Bacti/Residual / HPC - cfu/mL																
Count Lab	5	4	4	5	4	4	5	4	5	4	4	5	53		$ \square$	
Max Lab Mean Lab	< 10	< 10	< 10 <	10 <10	10	< 10	< 10	< 10	20 <		< 10	< 40		10 755	40	
Min Lab	< 10	< 10	< 10 <	· 10 <	10	< 10	< 10	< 10 <	< 10 <		< 10	< 10		10.700		10
3rd Bacti/Residual / Total Coliform: TC - cfu/100mL																
Count Lab	5	4	4	5	4	4	5	4	5	4	4	5	53			
Max Lab	0	0	0	0	0	0	0	0	0	0	0	0			0	
Mean Lab Min Lob	0	0	0	0	0	0	0	0	0	0	0	0		0		
IVIIN LAD 3rd Bacti/Residual / E. Coli - cfu/100ml	0	U	0	U	0	0	0	0	0	0	0	0				0
Count Lab	5	4	4	5	4	4	5	4	5	4	4	5	53			
Max Lab	0	0	0	0	0	0	0	0	0	0	0	0			0	
Mean Lab	0	0	0	0	0	0	0	0	0	0	0	0		0		
Min Lab	0	0	0	0	0	0	0	0	0	0	0	0				0
Ath Pooti/Decidual / Tatal Oalitan To 1/100															[
Count Lab	5	Λ	Δ	5	Δ	1	5	Δ	5	Δ	1	5	52			
Max Lab	0	0	0	0	0	0	0	0	0	0	0	0			0	
Mean Lab	0	0	0	0	0	0	0	0	0	0	0	0		0		
Min Lab	0	0	0	0	0	0	0	0	0	0	0	0				0
4th Bacti/Residual / E. Coli - cfu/100mL																
Count Lab	5	4	4	5	4	4	5	4	5	4	4	5	53			
Max Lab Mean Lab	0	0	0	0	0	0	0	0	0	0	0	0			0	
Min Lab	0	0	0	0	0	0	0	0	0	0	0	0				0
4th Bacti/Residual / HPC - cfu/mL		, , , , , , , , , , , , , , , , , , ,									-	, , , , , , , , , , , , , , , , , , ,				0
Count Lab	5	4	4	5	4	4	5	4	5	4	4	5	53			
Max Lab	< 10	< 10	< 10 <	: 10 <	10	< 10	< 10	80 <	< 130 <	· 10 ·	< 10	< 10			130	
Mean Lab Min Lab	< 10	< 10	< 10 <	< 10 <	10	< 10	< 10	< 27.5 <	< 34 <	< 10 ·	< 10	< 10	<	13.585		4.0

APPENDIX B Monthly Summary of Operational Data

NEW LISKEARD DRINKING WATER SYSTEM 2019 SUMMARY OF OPERATIONAL RESULTS

Facility Works Number: Facility Owner: Facility Classification:

220000344 Municipality: City of Temiskaming Shores Class 1 Water Treatment

RAW WATER	01/2019	9	02/2019		03/2019	04/2019	05/2019	06/2019	07/2019	08/2019	09/2019	10/2019	11/2019	12/2019	Total	Avg	Max	Min
Well 3 / Turbidity - NTU																		
Count IH	4		4		4	5	4	4	5	4	5	4	4	5	52			
Total IH	3.61		3.29		2.2	2.69	1.91	0.72	1.7	1.36	2.97	3.29	2.06	1.79	27.59			
Max IH	0.98		0.94		0.65	0.6	0.61	0.24	0.41	0.51	0.71	0.9	0.65	0.49			0.98	
Mean IH	0.903		0.823		0.55	0.538	0.478	0.18	0.34	0.34	0.594	0.823	0.515	0.358		0.531		
Min IH	0.82		0.71		0.48	0.47	0.37	0.1	0.29	0.16	0.37	0.75	0.32	0.2				0.1
Well 4 / Turbidity - NTU																		
Count IH	4		4		4	5	4	4	5	4	5	4	4	5	52			
Total IH	2.94		3.59		3.2	3.85	3.54	1.2	1.23	1.68	3.67	2.42	2.73	1.64	31.69			
Max IH	0.82		0.98		0.87	0.89	0.93	0.53	0.31	0.49	0.88	0.9	1.1	0.5			1.1	
Mean IH	0.735		0.898		0.8	0.77	0.885	0.3	0.246	0.42	0.734	0.605	0.683	0.328		0.609		
Min IH	0.62		0.8		0.75	0.69	0.82	0.15	0.19	0.34	0.29	0.35	0.3	0.21				0.15
						•	•											
TREATED WATER	01/2019	9	02/2019		03/2019	04/2019	05/2019	06/2019	07/2019	08/2019	09/2019	10/2019	11/2019	12/2019	Total	Avg	Max	Min
Treated Water POE / CI Residual: Free (0.40 mg/L) - mg/L																		
Max OL	1.77		5.04		1.76	2.41	3.11	1.32	2.16	2.46	1.59	1.79	5.04	1.95			5.04	
Mean OL	1.022		1.023		1.047	0.948	1.188	1.18	1.217	1.251	1.242	1.308	1.221	1.214		1.155		
Min OL	0.75		0.64		0.7	0.56	0.68	0.85	0.89	1.03	0.9	0.83	0.84	0.8				0.56
			- <u>-</u>		<u>_</u>				•			• • • • • •					•	- <u>-</u>
DISTRIBUTION WATER	01/2019	9	02/2019		03/2019	04/2019	05/2019	06/2019	07/2019	08/2019	09/2019	10/2019	11/2019	12/2019	Total	Avg	Max	Min
1st Bacti/Residual / CI Residual: Free - mg/L																		
Count IH	9		8		8	9	9	8	9	9	9	8	9	9	104			
Total IH	6.29		5.99		5.267	6.65	7.57	5.93	7.05	7.53	7.44	6.74	6.38	6.91	79.747			
Max IH	0.83		1.02		0.787	0.87	1.2	0.95	0.97	1.07	1.12	1.1	0.8	1.17			1.2	
Mean IH	0.699		0.749		0.658	0.739	0.841	0.741	0.783	0.837	0.827	0.842	0.709	0.768		0.767		
Min IH	0.55		0.49		0.53	0.62	0.7	0.63	0.56	0.7	0.69	0.6	0.59	0.57				0.49
2nd Bacti/Residual / CI Residual: Free - mg/L																		
Count IH	9		8		8	9	9	8	9	9	9	8	9	9	104			
Total IH	6.17		6.18		6	7.67	7.54	5.46	7.72	8.11	7.54	6.91	6.51	7.36	83.17			
Max IH	0.93		0.86		0.93	1.67	0.97	0.92	1.19	1.04	1.05	1.3	0.84	1.38			1.67	
Mean IH	0.686		0.773		0.75	0.852	0.838	0.683	0.858	0.901	0.838	0.864	0.723	0.818		0.8		
Min IH	0.59		0.67		0.62	0.6	0.63	0.43	0.56	0.8	0.66	0.58	0.55	0.42				0.42
3rd Bacti/Residual / Cl Residual: Free - mg/L																		
Count IH	9		8		8	9	9	8	9	9	9	8	9	9	104			
Total IH	6.8		6.01		5.9	5.93	7.36	6.03	6.41	7.8	7.19	6.91	6.84	6.51	79.69			
Max IH	1.12		0.87		0.86	1.08	1	1.06	1.07	1.03	1.21	1.12	1	0.81			1.21	
Mean IH	0.756		0.751		0.738	0.659	0.818	0.754	0.712	0.867	0.799	0.864	0.76	0.723		0.766		
Min IH	0.34		0.68		0.62	0.1	0.66	0.53	0.25	0.66	0.36	0.58	0.57	0.55				0.1
4th Bacti/Residual / Cl Residual: Free - mg/L																		
Count IH	5		4		4	5	4	4	5	4	5	4	4	5	53			
Total IH	3.6	╈	2.61		2.97	3.2	3.25	2.83	4.4	3.08	3.82	3.24	2.73	3.33	39.06	1 1	1	
Max IH	0.77	\top	0.83		0.81	0.71	0.85	0.95	1.09	0.86	1.04	0.95	0.77	0.8			1.09	
Mean IH	0.72	\top	0.653		0.743	0.64	0.813	0.708	0.88	0.77	0.764	0.81	0.683	0.666		0.737	1 1	
Min IH	0.65		0.3		0.69	0.48	0.7	0.4	0.69	0.71	0.53	0.68	0.61	0.48				0.3
RADLEY HILL ROAD	01/2019	9	02/2019		03/2019	04/2019	05/2019	06/2019	07/2019	08/2019	09/2019	10/2019	11/2019	12/2019	Total	Avg	Max	Min

RAW WATER	01/2019	02/2019	03/2019	04/2019	05/2019	06/2019	07/2019	08/2019	09/2019	10/2019	11/2019	12/2019	Total	Avg	Max	Min
Well 3 / Turbidity - NTU																
Count IH	4	4	4	5	4	4	5	4	5	4	4	5	52			
Total IH	3.61	3.29	2.2	2.69	1.91	0.72	1.7	1.36	2.97	3.29	2.06	1.79	27.59			
Max IH	0.98	0.94	0.65	0.6	0.61	0.24	0.41	0.51	0.71	0.9	0.65	0.49			0.98	
Mean IH	0.903	0.823	0.55	0.538	0.478	0.18	0.34	0.34	0.594	0.823	0.515	0.358		0.531		
Min IH	0.82	0.71	0.48	0.47	0.37	0.1	0.29	0.16	0.37	0.75	0.32	0.2				0.1
Well 4 / Turbidity - NTU																
Count IH	4	4	4	5	4	4	5	4	5	4	4	5	52			
Total IH	2.94	3.59	3.2	3.85	3.54	1.2	1.23	1.68	3.67	2.42	2.73	1.64	31.69			
Max IH	0.82	0.98	0.87	0.89	0.93	0.53	0.31	0.49	0.88	0.9	1.1	0.5			1.1	
Mean IH	0.735	0.898	0.8	0.77	0.885	0.3	0.246	0.42	0.734	0.605	0.683	0.328		0.609		
Min IH	0.62	0.8	0.75	0.69	0.82	0.15	0.19	0.34	0.29	0.35	0.3	0.21				0.15
TREATED WATER	01/2019	02/2019	03/2019	04/2019	05/2019	06/2019	07/2019	08/2019	09/2019	10/2019	11/2019	12/2019	Total	Avg	Max	Min
Treated Water POE / CI Residual: Free (0.40 mg/L) - mg/L																
Max OL	1.77	5.04	1.76	2.41	3.11	1.32	2.16	2.46	1.59	1.79	5.04	1.95			5.04	
Mean OL	1.022	1.023	1.047	0.948	1.188	1.18	1.217	1.251	1.242	1.308	1.221	1.214		1.155		
Min OL	0.75	0.64	0.7	0.56	0.68	0.85	0.89	1.03	0.9	0.83	0.84	0.8				0.56
DISTRIBUTION WATER	01/2019	02/2019	03/2019	04/2019	05/2019	06/2019	07/2019	08/2019	09/2019	10/2019	11/2019	12/2019	Total	Avg	Max	Min
1st Bacti/Residual / Cl Residual: Free - mg/L																
Count IH	9	8	8	9	9	8	9	9	9	8	9	9	104			
Total IH	6.29	5.99	5.267	6.65	7.57	5.93	7.05	7.53	7.44	6.74	6.38	6.91	79.747			
Max IH	0.83	1.02	0.787	0.87	1.2	0.95	0.97	1.07	1.12	1.1	0.8	1.17			1.2	
Mean IH	0.699	0.749	0.658	0.739	0.841	0.741	0.783	0.837	0.827	0.842	0.709	0.768		0.767		
Min IH	0.55	0.49	0.53	0.62	0.7	0.63	0.56	0.7	0.69	0.6	0.59	0.57				0.49
2nd Bacti/Residual / CI Residual: Free - mg/L																
Count IH	9	8	8	9	9	8	9	9	9	8	9	9	104			
Total IH	6.17	6.18	6	7.67	7.54	5.46	7.72	8.11	7.54	6.91	6.51	7.36	83.17			
Max IH	0.93	0.86	0.93	1.67	0.97	0.92	1.19	1.04	1.05	1.3	0.84	1.38			1.67	
Mean IH	0.686	0.773	0.75	0.852	0.838	0.683	0.858	0.901	0.838	0.864	0.723	0.818		0.8		
Min IH	0.59	0.67	0.62	0.6	0.63	0.43	0.56	0.8	0.66	0.58	0.55	0.42				0.42
3rd Bacti/Residual / Cl Residual: Free - mg/L																
Count IH	9	8	8	9	9	8	9	9	9	8	9	9	104			
Total IH	6.8	6.01	5.9	5.93	7.36	6.03	6.41	7.8	7.19	6.91	6.84	6.51	79.69			
Max IH	1.12	0.87	0.86	1.08	1	1.06	1.07	1.03	1.21	1.12	1	0.81			1.21	
Mean IH	0.756	0.751	0.738	0.659	0.818	0.754	0.712	0.867	0.799	0.864	0.76	0.723		0.766		
Min IH	0.34	0.68	0.62	0.1	0.66	0.53	0.25	0.66	0.36	0.58	0.57	0.55				0.1
4th Bacti/Residual / Cl Residual: Free - mg/L																
Count IH	5	4	4	5	4	4	5	4	5	4	4	5	53			
Total IH	3.6	2.61	2.97	3.2	3.25	2.83	4.4	3.08	3.82	3.24	2.73	3.33	39.06			
Max IH	0.77	0.83	0.81	0.71	0.85	0.95	1.09	0.86	1.04	0.95	0.77	0.8			1.09	
Mean IH	0.72	0.653	0.743	0.64	0.813	0.708	0.88	0.77	0.764	0.81	0.683	0.666		0.737		
Min IH	0.65	0.3	0.69	0.48	0.7	0.4	0.69	0.71	0.53	0.68	0.61	0.48				0.3
RADLEY HILL ROAD	01/2019	02/2019	03/2019	04/2019	05/2019	06/2019	07/2019	08/2019	09/2019	10/2019	11/2019	12/2019	Total	Avg	Max	Min

RAW WATER	01/2019	02/2019	03/2019	04/2019	05/2019	06/2019	07/2019	08/2019	09/2019	10/2019	11/2019	12/2019	Total	Avg	Max	Min
Well 3 / Turbidity - NTU																
Count IH	4	4	4	5	4	4	5	4	5	4	4	5	52			
Total IH	3.61	3.29	2.2	2.69	1.91	0.72	1.7	1.36	2.97	3.29	2.06	1.79	27.59			
Max IH	0.98	0.94	0.65	0.6	0.61	0.24	0.41	0.51	0.71	0.9	0.65	0.49			0.98	
Mean IH	0.903	0.823	0.55	0.538	0.478	0.18	0.34	0.34	0.594	0.823	0.515	0.358		0.531		
Min IH	0.82	0.71	0.48	0.47	0.37	0.1	0.29	0.16	0.37	0.75	0.32	0.2				0.1
Well 4 / Turbidity - NTU																
Count IH	4	4	4	5	4	4	5	4	5	4	4	5	52			
Total IH	2.94	3.59	3.2	3.85	3.54	1.2	1.23	1.68	3.67	2.42	2.73	1.64	31.69			
Max IH	0.82	0.98	0.87	0.89	0.93	0.53	0.31	0.49	0.88	0.9	1.1	0.5			1.1	
Mean IH	0.735	0.898	0.8	0.77	0.885	0.3	0.246	0.42	0.734	0.605	0.683	0.328		0.609		
Min IH	0.62	0.8	0.75	0.69	0.82	0.15	0.19	0.34	0.29	0.35	0.3	0.21				0.15
TREATED WATER	01/2019	02/2019	03/2019	04/2019	05/2019	06/2019	07/2019	08/2019	09/2019	10/2019	11/2019	12/2019	Total	Avg	Max	Min
Treated Water POE / CI Residual: Free (0.40 mg/L) - mg/L																
Max OL	1.77	5.04	1.76	2.41	3.11	1.32	2.16	2.46	1.59	1.79	5.04	1.95			5.04	
Mean OL	1.022	1.023	1.047	0.948	1.188	1.18	1.217	1.251	1.242	1.308	1.221	1.214		1.155		
Min OL	0.75	0.64	0.7	0.56	0.68	0.85	0.89	1.03	0.9	0.83	0.84	0.8				0.56
															·	
DISTRIBUTION WATER	01/2019	02/2019	03/2019	04/2019	05/2019	06/2019	07/2019	08/2019	09/2019	10/2019	11/2019	12/2019	Total	Avg	Max	Min
1st Bacti/Residual / Cl Residual: Free - mg/L																
Count IH	9	8	8	9	9	8	9	9	9	8	9	9	104			
Total IH	6.29	5.99	5.267	6.65	7.57	5.93	7.05	7.53	7.44	6.74	6.38	6.91	79.747			
Max IH	0.83	1.02	0.787	0.87	1.2	0.95	0.97	1.07	1.12	1.1	0.8	1.17			1.2	
Mean IH	0.699	0.749	0.658	0.739	0.841	0.741	0.783	0.837	0.827	0.842	0.709	0.768		0.767		
Min IH	0.55	0.49	0.53	0.62	0.7	0.63	0.56	0.7	0.69	0.6	0.59	0.57				0.49
2nd Bacti/Residual / Cl Residual: Free - mg/L																
Count IH	9	8	8	9	9	8	9	9	9	8	9	9	104			
Total IH	6.17	6.18	6	7.67	7.54	5.46	7.72	8.11	7.54	6.91	6.51	7.36	83.17			
Max IH	0.93	0.86	0.93	1.67	0.97	0.92	1.19	1.04	1.05	1.3	0.84	1.38			1.67	
Mean IH	0.686	0.773	0.75	0.852	0.838	0.683	0.858	0.901	0.838	0.864	0.723	0.818		0.8		
Min IH	0.59	0.67	0.62	0.6	0.63	0.43	0.56	0.8	0.66	0.58	0.55	0.42				0.42
3rd Bacti/Residual / Cl Residual: Free - mg/L																
Count IH	9	8	8	9	9	8	9	9	9	8	9	9	104			
Total IH	6.8	6.01	5.9	5.93	7.36	6.03	6.41	7.8	7.19	6.91	6.84	6.51	79.69			
Max IH	1.12	0.87	0.86	1.08	1	1.06	1.07	1.03	1.21	1.12	1	0.81			1.21	
Mean IH	0.756	0.751	0.738	0.659	0.818	0.754	0.712	0.867	0.799	0.864	0.76	0.723		0.766		
Min IH	0.34	0.68	0.62	0.1	0.66	0.53	0.25	0.66	0.36	0.58	0.57	0.55				0.1
4th Bacti/Residual / Cl Residual: Free - mg/L																
Count IH	5	4	4	5	4	4	5	4	5	4	4	5	53			
Total IH	3.6	2.61	2.97	3.2	3.25	2.83	4.4	3.08	3.82	3.24	2.73	3.33	39.06			
Max IH	0.77	0.83	0.81	0.71	0.85	0.95	1.09	0.86	1.04	0.95	0.77	0.8			1.09	
Mean IH	0.72	0.653	0.743	0.64	0.813	0.708	0.88	0.77	0.764	0.81	0.683	0.666		0.737		
Min IH	0.65	0.3	0.69	0.48	0.7	0.4	0.69	0.71	0.53	0.68	0.61	0.48				0.3
RADLEY HILL ROAD	01/2019	02/2019	03/2019	04/2019	05/2019	06/2019	07/2019	08/2019	09/2019	10/2019	11/2019	12/2019	Total	Avg	Max	Min

RADLEY HILL ROAD	01/2019	02/2019	03/2019	04/2019	05/2019	06/2019	07/2019	08/2019	09/2019	10/2019	11/2019	12/2019	Total	Avg	Max	Min
Manitoulin Transport / UV Dosage - mJ/cm ²																
Count IH	8	7	9	8	9	8	6	9	9	8	8	8	97			
Total IH	2011.7	1891.1	2526.7	3025.7	3373	2790	1892.3	2616.1	2368	2005.2	1881	1765.6	28146.4			
Max IH	272	293.1	378.1	401.7	385.7	367	340.7	301.2	279	253.4	238.2	231			401.7	
Mean IH	251.463	270.157	280.744	378.213	374.778	348.75	315.383	290.678	263.111	250.65	235.125	220.7		290.169		
Min IH	231.3	256.4	244.5	353.9	364	320	297	275.3	245.5	248.9	231.5	209.9				209.9