

ANNUAL REPORT

ONTARIO REGULATION 170/03
SECTION 11

THORNTON DRINKING WATER SYSTEM



**FOR THE PERIOD:
JANUARY 1, 2019 – DECEMBER 31, 2019**

*Prepared for the Corporation of the Township of Essa
by the Ontario Clean Water Agency*



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

Drinking-Water System Number:	220006945
Drinking-Water System Name:	Thornton Drinking Water System
Drinking-Water System Owner:	The Corporation of the Township of Essa
Drinking-Water System Category:	Large Municipal Residential
Period being reported:	January 1, 2019 to December 31, 2019

Does your Drinking-Water System serve more than 10,000 people?

Is your annual report available to the public at no charge on a web site on the Internet?

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

Summary Report is available for inspection at the Township of Essa Municipal Office at 5786 Simcoe County Road 21, Utopia, Essa Township, ON, L0M 1T0 or it can be found at the following website: <http://www.essatownship.on.ca>

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
Not applicable	Not applicable

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?

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

- Public access/notice via the web
- Public access/notice via Government Office
- Public access/notice via a newspaper
- Public access/notice via Public Request
- Public access/notice via a Public Library
- Public access/notice via other method

Description of Drinking-Water System:

The Thornton Drinking Water System pumphouse is located on Glen Avenue in the Village of Thornton in the Township of Essa. Raw water is supplied to the pumphouse by means of four (4) drilled wells each equipped with submersible well pumps. Wells 1 and 2 are comprised of 150 mm diameter casings extending to depths of 50 m and 52 m, respectively. Wells 1 and 2 are located adjacent to the pump house each with a maximum pumping rate of 6.06 L/s at a TDH of 73 m. Wells 3 and 4 are located in the Thornton Creek Estate subdivision, North of the Glen Avenue pumphouse. Well 3 is comprised of a 300 mm diameter casing extending to a depth of 32 m and is capable of pumping 5.7 L/s at a TDH of 60 m. Well 4 is comprised of a 160 mm diameter casing extending to a depth of 31.4 m and is capable of pumping 3.8 L/s at a TDH of 73 m. Controls for wells 3 and 4 are located in an adjacent building. Water is pumped from the wells to the Glen Avenue pumphouse where it is disinfected with NSF certified 12% Sodium Hypochlorite. The Sodium Hypochlorite is stored in a 1,000 L bulk storage tank and a 300 L day tank. The solution is injected into the main header by one of two (2) chemical feed pumps, each capable of pumping 2.5 L/hr. Treated water is pumped to two (2) fused glass-lined bolted steel above-ground storage tanks, each with a capacity of 556 m³. Water is pumped from the storage tanks to the distribution system by four (4) variable frequency drive high lift pumps, each with a rated pumping capacity of 26.52 L/s.

Online analyzers monitor treated water for free chlorine residual and turbidity. Operational data, including pump run hours, flow rates, free chlorine residual, and turbidity are recorded on a data logger located on the MCC panel. The logged data is downloaded periodically and stored on the main server at the OCWA office in Wasaga Beach. The system is alarmed for numerous parameters and is monitored continuously by Huronia Alarms in Midland Ontario. The Glen Avenue pumphouse is equipped with a 175 kW diesel generator with automatic switch over to provide power in the event of a power failure.

List of water treatment chemicals used during the reporting period:

- Sodium Hypochlorite 12% Solution NSF, Primary Disinfection

Significant expenses incurred to:

- Install required equipment
- Purchase required equipment
- Repair required equipment
- Replace required equipment

Description of significant expenses incurred:

1. Repaired service line leaks and meters at multiple residences.
2. Replaced chlorine probes and caps
3. Repaired chemical dosing pumps
4. Installed facility chlorine control switches
5. Diesel generator upgrades
6. Installed chlorine Miltronics

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 (yyyy/mm/dd)	Parameter	Result	Unit of Measure	Corrective Action	Corrective Action Date (yyyy/mm/dd)
2019/08/06	Free Chlorine Residual	0.03	mg/L	Immediately flushed the watermains and restored secondary disinfection to above 0.05 mg/L (as per O. Reg. 170/03 17-4 1.). Oral and written notification. AWQI # 147069. No additional instructions were provided by the Public Health Inspector.	2019/08/06

Table 1: Microbiological testing done under the Schedule 11 of Regulation 170/03 during this reporting period.

Location	Number of Samples	Range of E. Coli or Fecal Results		Range of Total Coliform Results		Number of HPC Samples	Range of HPC Samples	
		Min	Max	Min	Max		Min	Max
Raw - RW1	52	0	0	0	0	N/A	N/A	N/A
Raw - RW2	52	0	0	0	0	N/A	N/A	N/A
Raw - RW3	52	0	6	0	6	N/A	N/A	N/A
Raw - RW4	47*	0	0	0	1	N/A	N/A	N/A
Treated - TW	52	0	0	0	0	52	0	2
Distribution - DW	125	0	0	0	0	52	0	1

Note:

- RW1 – Raw Water Well #1
- RW2 – Raw Water Well #2
- RW3 – Raw Water Well #3
- RW4 – Raw Water Well #4

*Well #4 was off line due to a well pump motor failure, so raw water samples could not be taken.

Table 2: Operational testing done under Schedule 7 of Regulation 170/03 during the period covered by this Annual Report.

Location & Test	Number of Samples	Range of Results	
		Minimum	Maximum
Turbidity, Raw RW1 (Grab) [NTU]	12	0.2	0.88
Turbidity, Raw RW2 (Grab) [NTU]	12	0.28	3.34
Turbidity, Raw RW3 (Grab) [NTU]	12	0.22	0.92
Turbidity, Raw RW4 (Grab) [NTU]	11	0.29	2.04
Turbidity, Treated (Continuous) [mg/L]	8760	0.07	5
Turbidity, Treated (Grab) [mg/L]	80	0.09	0.55
Free Chlorine Residual, Treated (Continuous) [mg/L]	8760	0*	2.79
Free Chlorine Residual, Treated (Grab) [mg/L]	166	1.04	2.5
Total Chlorine Residual, Treated (Grab) [mg/L]	166	1.25	2.7

Location & Test	Number of Samples	Range of Results	
		Minimum	Maximum
Free Chlorine Residual, Distribution (Grab) [mg/L]	366	0.86	2.9

Note: The number of samples used for continuous monitoring units is 8760.

* Min chlorine residual was due to a high lift pump failure, a temporary pumping station and alternative water source was used during repairs.

Table 3: 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
Not Applicable				

Table 4: Summary of Inorganic parameters tested during this reporting period or the most recent sample results

Parameter	Sample Date (yyyy/mm/dd)	Sample Result	Maximum Allowable Concentration (MAC)	Number of Exceedances	
				MAC	½ MAC
Antimony: Sb (µg/L) - TW	2018/01/03	<MDL 0.02	6.0	No	No
Arsenic: As (µg/L) - TW	2018/01/03	<MDL 0.2	10.0	No	No
Barium: Ba (µg/L) - TW	2018/01/03	80.8	1000.0	No	No
Boron: B (µg/L) - TW	2018/01/03	34.0	5000.0	No	No
Cadmium: Cd (µg/L) - TW	2018/01/03	<MDL 0.003	5.0	No	No
Chromium: Cr (µg/L) - TW	2018/01/03	0.33	50.0	No	No
Mercury: Hg (µg/L) - TW	2018/01/03	<MDL 0.01	1.0	No	No
Selenium: Se (µg/L) - TW	2018/01/03	0.1	50.0	No	No
Uranium: U (µg/L) - TW	2018/01/03	0.689	20.0	No	No
Fluoride: F (mg/L) - TW	2018/07/17	0.22	1.5	No	No
Nitrite (mg/L) - TW	2019/01/14	<MDL 0.003	1.0	No	No
Nitrite (mg/L) - TW	2019/04/05	<MDL 0.003	1.0	No	No
Nitrite (mg/L) - TW	2019/07/15	<MDL 0.003	1.0	No	No
Nitrite (mg/L) - TW	2019/10/28	<MDL 0.003	1.0	No	No
Nitrate (mg/L) - TW	2019/01/14	1.46	10.0	No	No
Nitrate (mg/L) - TW	2019/04/05	1.23	10.0	No	No
Nitrate (mg/L) - TW	2019/07/15	1.55	10.0	No	No
Nitrate (mg/L) - TW	2019/10/28	1.33	10.0	No	No
Sodium: Na (mg/L) - TW	2018/07/24	37.0	20*	Yes	Yes

Note: MDL = Minimum Detection Limit

*There is no "MAC" for Sodium. The aesthetic objective is 200 mg/L. The local Medical Officer of Health should be notified when the sodium concentration exceeds 20 mg/L so that this information may be communicated to local physicians for their use with patients on sodium restricted diets.

Table 5: Summary of lead testing under Schedule 15.1 during this reporting period

Location Type	Number of Samples	Range of Lead Results		MAC	Number of Exceedances
		Minimum	Maximum		
Lead – Plumbing (µg/L)	Not Applicable - Relief from all Plumbing Requirements*				
Lead – Distribution** (µg/L)	Not Applicable for Reporting Period.				

Note: *The Alkalinity results for 2019 were 201, 208, 212, and 232 mg/L as CaCO₃.*

*This system qualifies for the plumbing exemption as per O. Regulation 170/03 Schedule 15.1-5 (9) (10).

**Distribution lead samples are taken every 36 months. The next set of distribution lead samples is scheduled for 2021.

Table 6: Summary of Organic parameters sampled during this reporting period or the most recent sample results

Parameter	Sample Date (yyyy/mm/dd)	Sample Result	Maximum Allowable Concentration (MAC)	Number of Exceedances	
				MAC	½ MAC
Alachlor (µg/L) - TW	2018/01/03	<MDL 0.02	5.0	No	No
Atrazine + N-dealkylated metabolites (µg/L) - TW	2018/01/03	<MDL 0.01	5.0	No	No
Azinphos-methyl (µg/L) - TW	2018/01/03	<MDL 0.05	20.0	No	No
Benzene (µg/L) - TW	2018/01/03	<MDL 0.32	1.0	No	No
Benzo(a)pyrene (µg/L) - TW	2018/01/03	<MDL 0.004	0.01	No	No
Bromoxynil (µg/L) - TW	2018/01/03	<MDL 0.33	5.0	No	No
Carbaryl (µg/L) - TW	2018/01/03	<MDL 0.05	90.0	No	No
Carbofuran (µg/L) - TW	2018/01/03	<MDL 0.01	90.0	No	No
Carbon Tetrachloride (µg/L) - TW	2018/01/03	<MDL 0.16	2.0	No	No
Chlorpyrifos (µg/L) - TW	2018/01/03	<MDL 0.02	90.0	No	No
Diazinon (µg/L) - TW	2018/01/03	<MDL 0.02	20.0	No	No
Dicamba (µg/L) - TW	2018/01/03	<MDL 0.2	120.0	No	No
1,2-Dichlorobenzene (µg/L) - TW	2018/01/03	<MDL 0.41	200.0	No	No
1,4-Dichlorobenzene (µg/L) - TW	2018/01/03	<MDL 0.36	5.0	No	No
1,2-Dichloroethane (µg/L) - TW	2018/01/03	<MDL 0.35	5.0	No	No
1,1-Dichloroethylene (µg/L) - TW	2018/01/03	<MDL 0.33	14.0	No	No
Dichloromethane (Methylene Chloride) (µg/L) - TW	2018/01/03	<MDL 0.35	50.0	No	No
2,4-Dichlorophenol (µg/L) - TW	2018/01/03	<MDL 0.15	900.0	No	No
2,4-Dichlorophenoxy acetic acid (2,4-D) (µg/L) - TW	2018/01/03	<MDL 0.19	100.0	No	No
Diclofop-methyl (µg/L) - TW	2018/01/03	<MDL 0.4	9.0	No	No
Dimethoate (µg/L) - TW	2018/01/03	<MDL 0.03	20.0	No	No
Diquat (µg/L) - TW	2018/01/03	<MDL 1.0	70.0	No	No
Diuron (µg/L) - TW	2018/01/03	<MDL 0.03	150.0	No	No
Glyphosate (µg/L) - TW	2018/01/03	<MDL 1.0	280.0	No	No
Malathion (µg/L) - TW	2018/01/03	<MDL 0.02	190.0	No	No
Metolachlor (µg/L) - TW	2018/01/03	<MDL 0.01	50.0	No	No
Metribuzin (µg/L) - TW	2018/01/03	<MDL 0.02	80.0	No	No
Monochlorobenzene	2018/01/03	<MDL 0.3	80.0	No	No

Parameter	Sample Date (yyyy/mm/dd)	Sample Result	Maximum Allowable Concentration (MAC)	Number of Exceedances	
				MAC	½ MAC
(Chlorobenzene) (µg/L) - TW					
Paraquat (µg/L) - TW	2018/01/03	<MDL 1.0	10.0	No	No
PCB (µg/L) - TW	2018/01/03	<MDL 0.04	3.0	No	No
Pentachlorophenol (µg/L) - TW	2018/01/03	<MDL 0.15	60.0	No	No
Phorate (µg/L) - TW	2018/01/03	<MDL 0.01	2.0	No	No
Picloram (µg/L) - TW	2018/01/03	<MDL 1.0	190.0	No	No
Prometryne (µg/L) - TW	2018/01/03	<MDL 0.03	1.0	No	No
Simazine (µg/L) - TW	2018/01/03	<MDL 0.01	10.0	No	No
Terbufos (µg/L) - TW	2018/01/03	<MDL 0.01	1.0	No	No
Tetrachloroethylene (µg/L) - TW	2018/01/03	<MDL 0.35	10.0	No	No
2,3,4,6-Tetrachlorophenol (µg/L) - TW	2018/01/03	<MDL 0.2	100.0	No	No
Triallate (µg/L) - TW	2018/01/03	<MDL 0.01	230.0	No	No
Trichloroethylene (µg/L) - TW	2018/01/03	<MDL 0.44	5.0	No	No
2,4,6-Trichlorophenol (µg/L) - TW	2018/01/03	<MDL 0.25	5.0	No	No
2-methyl-4-chlorophenoxyacetic acid (MCPA) (µg/L) - TW	2018/01/03	<MDL 0.12	100.0	No	No
Trifluralin (µg/L) - TW	2018/01/03	<MDL 0.02	45.0	No	No
Vinyl Chloride (µg/L) - TW	2018/01/03	<MDL 0.17	1.0	No	No
Trihalomethane: Total Annual Average (µg/L) - DW	4 Quarters of 2019	23.25	100.00	No	No
Haloacetic Acid: Total Annual Average (µg/L) - DW	4 Quarters of 2019	16.125	80.00	No	No

Note: MDL = Minimum Detection Limit

Table 7: List of 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
Sodium: Na – TW	37.0	mg/L	2018/07/24

Note: This table highlights the parameters with a “Yes” in the ½ MAC columns of Table 4 and Table 6.