Owen Sound Drinking Water System

Annual Report 2018

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Table of Contents

Section 1 – Drinking Water System General Information

This report has been prepared in accordance with the reporting requirements set out in Ontario Regulation 170/03, Section 11 and as well as Schedule 22.

This report is to be presented to Council by the end of March each year. Copies of the report will be made available free of charge and can be found at the following locations;

- City Hall Clerk's Office – located temporarily at 945 3rd Avenue East
- City's website - https://www.owensound.ca/en/city-hall/waterwastewater.aspx
- Public Works office – 1900 20th Street East
- Water Treatment Plant – 2600 3rd Avenue East
- Owen Sound & North Grey Union Public Library – 824 1st Avenue West

Drinking Water System #	**220001799**
Drinking Water System Name	**Owen Sound Drinking Water System**
Drinking Water System Owner	**Corporation of the City of Owen Sound**
Drinking Water System Category	**Large Municipal Residential**
City of Owen Sound Population	**22,000**
Water Treatment Subsystem	**Class 3, Certificate # 20** issued September 15th, 2005
Water Distribution Subsystem	**Class 3, Certificate # 2094** issued September 15th, 2005
Drinking Water Works Permit #	**092-201 Issue # 4** issued October 6th, 2015
Municipal Drinking Water License	**092-101 Issue # 4** issued January 10th, 2017
Permit to Take Water #	**3044-8SERHC** issued March 23rd, 2012 expires March 15, 2022
Period of Report	**January 1, 2018 to December 31st, 2018**

Other Drinking Water Systems that receive drinking water from the Owen Sound Drinking Water System are;

Drinking Water System Owner	**Drinking Water System #**
Municipality of Meaford (Leith)	260065312

A copy of this report will be provided to Meaford by the end of February.

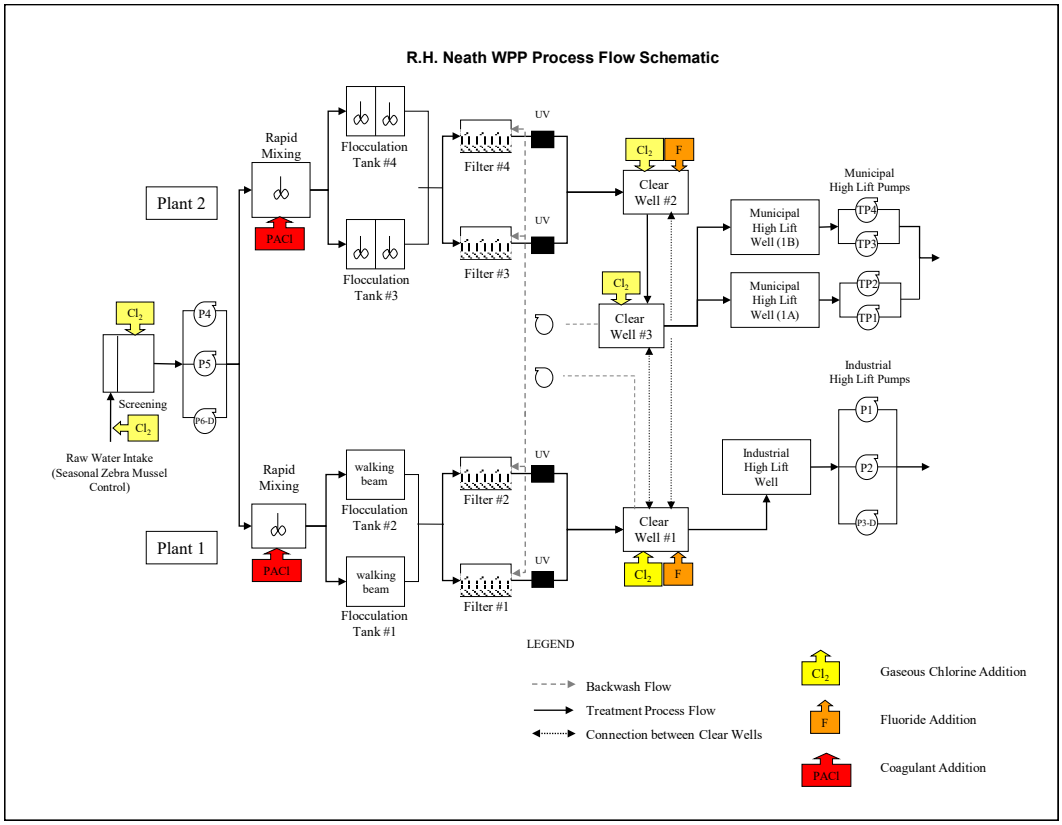
Section 1.1 – Drinking Water System Description

The Richard H. Neath Water Purification plant is a direct filtration surface water treatment plant that draws its water from Georgian Bay. This plant serves a population of approximately 22,000 people.

The Water plant comprises of the following processes;

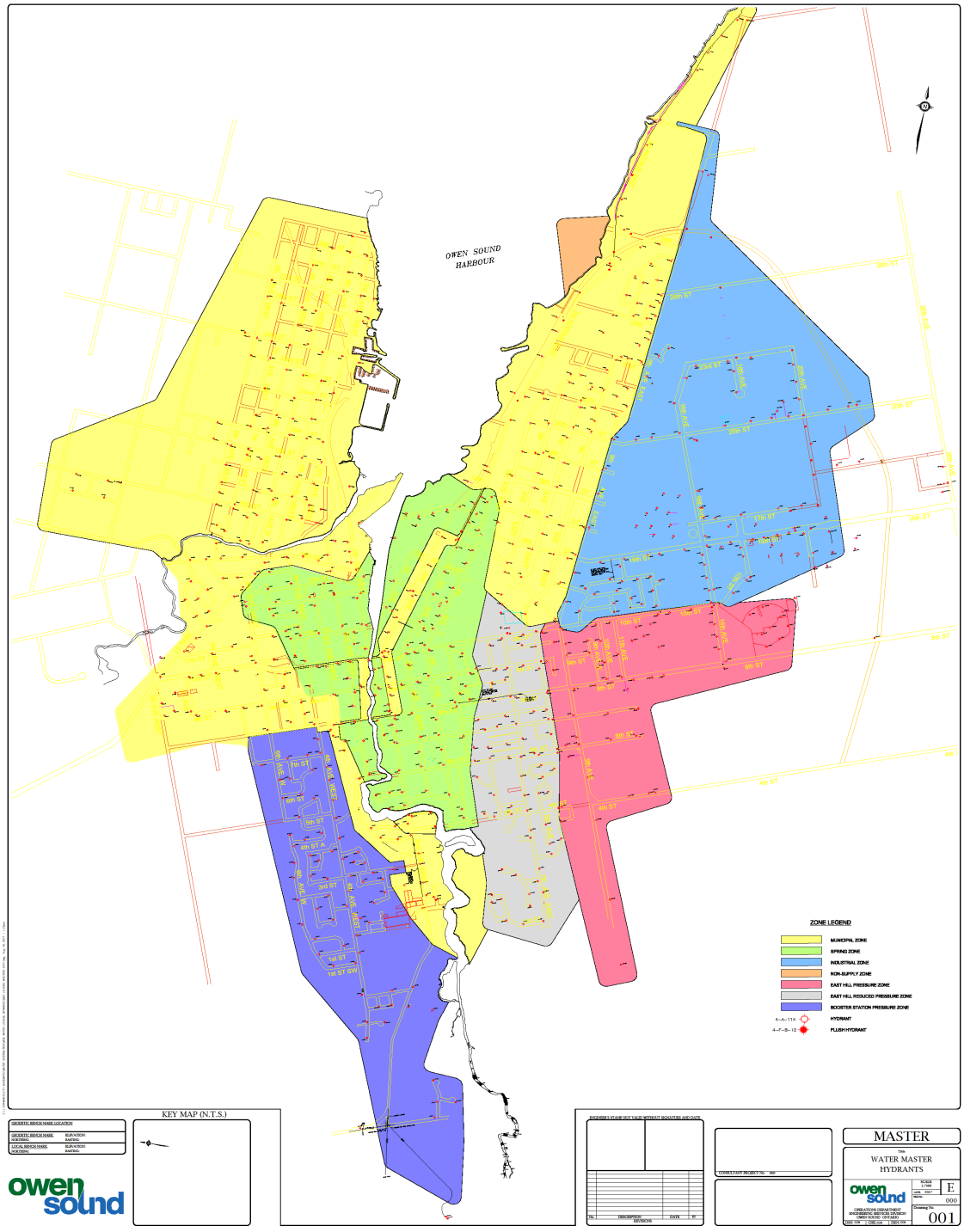
- Raw water screening (removal of larger debris, fish, etc.),
- Prechlorination (initial application of chlorine to the raw water),
- Zebra mussel control (chlorination at Intake during warmer months only, temperature above 10 degrees C),
- Flash mixing (initial addition of coagulant to the raw water through a rapid mixer),
- Coagulation/Flocculation (slower mixing of coagulant in larger tanks),
- UV disinfection (done just prior to water entering treated water wells),
- Post chlorination (adding of additional chlorine for the purpose of meeting CT requirements and having enough chlorine for water in the distribution system),
- Fluoridation (added in the two main treated water wells),
- Residue management tank for treating backwash wastewater. See Figure 1 below for a process schematic.

Figure 1



The City has a 22,000 m^3 reservoir, 6 pressure zones (see Figure 2), 155 km of water mains, various pressure reducing valve chambers, 639 City hydrants, 130 private hydrants, and two booster stations that provides addition pressure in the Southeast and southwest portions of the City and outskirts.

Figure 2



The City also has an additional agreement with the Municipality of Meaford to provide potable water to Leith from our boundary point on East Bayshore Rd.

Section 2 – Drinking Water Inspections and Audit Summaries

1. **Ministry of the Environment, Conservation and Parks (MECP) Inspection –** During 2018, an MECP inspection occurred on December 3rd, 2018, inspection # 1-JG2B5. There were no non-compliance items identified, but some recommendations were noted, they are as follows;

    - site visits and training exercises to deal with corrective actions identified in Ontario Regulation 170/03,
    - Testing of the disinfection system alarms and related tasks,
    - Consult with Meaford in regards to adding a chlorine analyzer and check valve at the City/Leith boundary chamber,
    - Owen Sound to complete and maintain a list of medium and high risk facilities documenting if backflow prevention is installed and if so, what maintenance has been done.
    - Contact MECP approvals to discuss options to mitigate past coagulant pump failures, including installation of an additional pump and associated approval requirements.

    The Owen Sound Drinking Water System received a 96.13% on the inspection report card.

2. **Internal Audit/External Audit**

    Internal Audit – Deb Zehr, an independent auditor evaluated our Drinking Water Quality Management System (DWQMS) In December 2018. This consisted of a two day on site visit reviewing all 21 elements of the DWQMS, interviewing water staff and testing their knowledge of the system.

    No non-conformances were found, however some opportunities for improvement were identified. The most significant recommendation was to make changes to Operational Plan to reflect the updates to the provincial Drinking Water Quality Management Standard, colloquially known as DWQMS 2.0.

Section 3 – List of Water Treatment Chemicals Used:

1. **Chlorine Gas** (68 kg cylinders) – used in pre chlorination (treatment before filtration), and post chlorination (treatment after filtration).
2. **PAX XL-6** – is a coagulant used prior to filtration in the colder months (<10

degrees C). A coagulants primary objective is to adhere to suspended particulates, make them bigger in size, allowing a higher removal rate of particulates in the filtration process.

3. **PAX XL-1900** – is a coagulant used prior to filtration in the warmer months (>10 degrees C). A coagulants primary objective is to adhere to suspended particulates, make them bigger in size, so there is a higher removal rate of particulates in the filtration process.

4. **Sodium Bisulphite** – is a chemical used in the process to remove chlorine from water for the purpose of reintroducing water back to the source, Georgian Bay. It is also used when filters are being prepared for use after a backwash called the ripening process.

5. **Polymer –** A polymer is used during a filter backwash to settle suspended particles in the wastewater detention tank, so they can be pumped to the sanitary system to be treated at the waste water plant.

Section 4 – Significant Costs Incurred

Significant costs are costs associated with new equipment purchased, installed, repaired, or replaced;

Item	Description	Cost ($)
Electric Valve Actuators	Replacement of nine (9) aging Rotork electric actuator for valve control on the filter system	$55,200
Underwater Remote Vehicle	Deep Trekker DTG2 remote vehicle. To be used for well and reservoir inspections.	$10,096
Confined Space Equipment	New Tripod and safety retrieval line	$7,500
UV Bulbs	UV Lamps for 4 UV reactors.	$14,700
UV System	Replacement of a UV system sensor, and calibration of 6 UV system sensors	$11,400
Online Equipment	Three (3) Online turbidimeters	$13,500
Generator Fuel System	Upgrades to the Fuel system at the Water Plant	$15,600
Broken Watermains	Eighteen (18) broken water mains occurred, estimated repair at $6,000 each. Two (2) breaks had much higher costs associated with them and are detailed below.	$108,000

Large Broken Watermain	Watermain break near Hobarts, Jan 2018. Negative Pressure Event. Internal costs for time and materials and also contractor costs	$25,000
Large Broken Watermain/Watermain Rehab	Watermain break 10th St West, July 2018. Negative Pressure Event. Includes costs internal and external during break, plus substantial contractor costs for system rehabilitation (line stop and new valve and valve rebuild and new hydrant) Nov 2018.	$240,000

Section 5 – Adverse Water Quality Incidents reported

#	Reporting Date	AWQI #	Adverse Location	Adverse Parameter	Adverse Result	Units	Remedial Action
1	10-Jan	138528	Industrial Zone	Low Pressure	<20	psi	Pressure drop caused by large main break, main isolated and pressure restored.
2	03-Feb	138687	Water Plant	No coagulant - Filters 3/4	n/a	n/a	Coagulant pump failure, problem fixed and restarted pump.
3	31-Jul	141191	Low Pressure/ Negative Pressure	Low Pressure	<20	psi	Caused by large main break, Northwest section of City affected. Main repaired, Do Not Drink Advisory issued, Bacteriological samples sent to lab, and test results came back negative. Advisory lifted August 1st.
4	31-Jul	141204	925 9th Ave 'A' West	Low Cl2 residual	0.03	mg/L	Occurred same day as main break (AWQI 141191), Water flushed, end Cl2 residual was 0.51 mg/L.
5	19-Sep	142937	190 1st Street SW Cemetery	Elevated Bacti Counts	E Coli 12, Total Coliform 15	cfu/100ml	Resampled adverse location twice as per Regulation, checked residuals in area, worked with Ministry of Environment, Conservation and Parks, and Ministry of Health. Posted a Do Not Drink Advisory to a small portion of the Southwest quadrant. Results came back negative on both sets of samples. Do Not Drink Advisory lifted on Sept 21st.

Section 6 – Microbiological Test Results

Microbiological testing done as required in Ontario Regulation 170/03 Schedule 10;

Location	Number of Samples	Range of E.coli Or Fecal Results (min #)-(max #)	Range of Total Coliform Results (min #)-(max #)	Number of HPC Samples	Range of HPC Results (min #)-(max #)
Raw	52	0-50	2-15,400	n/a	n/a
Treated	52	0-0	0-0	50	<10-200
Distribution	458	0-12	0-15	104	<10-30

Section 7 – Operational Testing Results

Operational testing done as required in Ontario Regulation 170/03 Schedule 7;

Parameter	Number of Grab Samples	Range of Results (min #) - (max #)
Filter 1 Turbidity	8760	**0.02 – 1.11 NTU*** Over 1 NTU for only 38 seconds.
Filter 2 Turbidity	8760	**0.00 – 0.98 NTU** *Low results was caused by a power bump on March 21st.
Filter 3 Turbidity	8760	**0.00 – 0.96 NTU** *Low results was caused by a power bump on March 21st.
Filter 4 Turbidity	8760	**0.00 – 1.58 NTU*** *Low results was caused by a power bump on March 21st. High result occurred September 27th, and was over 1 NTU for approximately 2 minutes.
Post 1 Chlorine	8760	**0.75-3.20**
Post 2 Chlorine	8760	**0.00-4.72*** Low residual caused by insufficient flow at analyzer on March 16th, and High result was caused by a startup of the filter system after a short downtime. Only spiked over 4 mg/L for 3 minutes.
Municipal Chlorine	8760	**1.19 – 2.03**
Industrial Chlorine	8760	**0.00 – 2.14 *** Low result was caused by a shutdown of the system on January 15-16th due to a large mainbreak close to the water plant.
Municipal Fluoride	8760	**0.27 – 1.55 ***Low and High residual was caused by a faulty reference sensor. Over 1.5 mg/L for only 2 minutes.
Industrial Fluoride	8760	**0.00 – 1.03 *** Low result caused by shutdown of Industrial system due to a large main break in January.

Note: Unit of measurement is in milligrams per litre (mg/L), unless stated otherwise. The number of grab samples is expressed in hours/year, equivalent to continuous monitoring.

Section 8 – Summary of Additional Testing

A summary of additional testing and sampling carried out by an approval, order, or other legal instrument.

Legal Document	Date of Legal Instrument Issued	Parameter	Date Sampled	Result	Unit of Measure
Municipal License # 092-101	January 10th, 2017	Chlorine – Wastewater System	02-Jan	0	mg/L
Municipal License # 092-101	January 10th, 2017	Aluminum	15-Jan	0.174	mg/L
Municipal License # 092-101	January 10th, 2017	Chlorine – Wastewater System	01-Feb	0	mg/L
Municipal License # 092-101	January 10th, 2017	Total Suspended Solids	01-Feb	2	mg/L
Municipal License # 092-101	January 10th, 2017	Chlorine – Wastewater System	01-Mar	0	mg/L
Municipal License # 092-101	January 10th, 2017	Chlorine – Wastewater System	03-Apr	0	mg/L
Municipal License # 092-101	January 10th, 2017	Aluminum	17-Apr	0.0611	mg/L
Municipal License # 092-101	January 10th, 2017	Chlorine – Wastewater System	01-May	0	mg/L
Municipal License # 092-101	January 10th, 2017	Total Suspended Solids	01-May	1	mg/L
Municipal License # 092-101	January 10th, 2017	Chlorine – Wastewater System	05-Jun	0	mg/L
Municipal License # 092-101	January 10th, 2017	Chlorine – Wastewater System	05-Jul	0	mg/L
Municipal License # 092-101	January 10th, 2017	Aluminum	16-Jul	0.0676	mg/L
Municipal License # 092-101	January 10th, 2017	Total Suspended Solids	02-Aug	1	mg/L
Municipal License # 092-101	January 10th, 2017	Chlorine – Wastewater System	02-Aug	0	mg/L
Municipal License # 092-101	January 10th, 2017	Chlorine – Wastewater System	05-Sep	0	mg/L
Municipal License # 092-101	January 10th, 2017	Chlorine – Wastewater System	15-Oct	0	mg/L
Municipal License # 092-101	January 10th, 2017	Aluminum	15-Oct	0.0183	mg/L
Municipal License # 092-101	January 10th, 2017	Total Suspended Solids	01-Nov	2	mg/L
Municipal License # 092-101	January 10th, 2017	Chlorine – Wastewater System	01-Nov	0	mg/L
Municipal License # 092-101	January 10th, 2017	Chlorine – Wastewater System	02-Dec	0	mg/L

Section 9 – Inorganic and Organic Testing Summary

Under Ontario Regulation 170/03, Schedule 13, 13-2 and 13-4 are required to be sampled annually.

Inorganic Parameters

Parameter	Sample Date	Result Value	Unit of Measure	MAC Level	1/2 MAC Level	Exceedance
Antimony	15-Jan	<0.00002	mg/L	**0.006**	0.003	No
Arsenic	15-Jan	<0.0002	mg/L	**0.025**	0.0125	No
Barium	15-Jan	0.0109	mg/L	**1.0**	0.5	No
Boron	15-Jan	0.015	mg/L	**5.0**	2.5	No
Cadmium	15-Jan	<0.000003	mg/L	**0.005**	0.0025	No
Chromium	15-Jan	0.00063	mg/L	**0.05**	0.025	No
Mercury	15-Jan	<0.00001	mg/L	**0.001**	0.0005	No
Selenium	15-Jan	0.0001	mg/L	**0.01**	0.005	No
Sodium	5-Feb-18	5.6	mg/L	**>20**	>10	No
Uranium	06-Jan	0.000139	mg/L	**0.02**	0.01	No
Fluoride – Municipal	31-Dec	0.59	mg/L	**1.50**	n/a	No
Fluoride - Industrial	31-Dec	0.66	mg/L	**1.50**	n/a	No
Nitrite	15-Oct	<0.003	mg/L	**1.0**	0.5	No
Nitrate	15-Oct	0.26	mg/L	**10.0**	5.0	No

Note: Unit of measurement is in milligrams per litre (mg/L), unless stated otherwise.

Organic Parameters

Parameter	Sample Date	Result Value	Unit of Measure	MAC Level	1/2 MAC Level	Over MAC?
Alachlor	15-Jan	<0.00002	mg/L	**0.005**	0.0025	No
Atrazine + N-dealkylated metobolites	15-Jan	<0.00001	mg/L	**0.009**	0.0045	No
Azinphos-methyl	15-Jan	<0.00005	mg/L	**0.005**	0.0025	No
Benzene	15-Jan	<0.00032	mg/L	**0.001**	0.0005	No
Benzo(a)pyrene	15-Jan	<0.000004	mg/L	**0.00001**	0.000005	No
Bromoxynil	15-Jan	<0.00033	mg/L	**0.005**	0.0025	No
Carbaryl	15-Jan	<0.00005	mg/L	**0.09**	0.045	No
Carbofuran	15-Jan	<0.00001	mg/L	**0.09**	0.045	No
Parameter	**Sample**	**Result**	**Unit of**	**MAC**	**1/2 MAC**	**Over**

	Date	Value	Measure	Level	Level	MAC?
Carbon Tetrachloride	15-Jan	<0.00016	mg/L	**0.002**	0.001	No
Chlorpyrifos	15-Jan	<0.00002	mg/L	**0.09**	0.045	No
Diazinon	15-Jan	<0.00002	mg/L	**0.02**	0.01	No
Dicamba	15-Jan	<0.0002	mg/L	**0.12**	0.06	No
1,2-Dichlorobenzene	15-Jan	<0.00041	mg/L	**0.2**	0.1	No
1,4-Dichlorobenzene	15-Jan	<0.00036	mg/L	**0.005**	0.0025	No
1,2-Dichloroethane	15-Jan	<0.00035	mg/L	**0.005**	0.0025	No
1,1-Dichloroethylene (vinylidene chloride)	15-Jan	<0.00033	mg/L	**0.014**	0.007	No
Dichloromethane	15-Jan	<0.00035	mg/L	**0.05**	0.025	No
2-4 Dichlorophenol	15-Jan	<0.00015	mg/L	**0.9**	0.45	No
2,4-Dichlorophenoxy acetic acid (2,4-D)	15-Jan	<0.00019	mg/L	**0.1**	0.05	No
Diclofop-methyl	15-Jan	<0.0004	mg/L	**0.009**	0.0045	No
Dimethoate	15-Jan	<0.00003	mg/L	**0.02**	0.01	No
Diquat	15-Jan	<0.001	mg/L	**0.07**	0.035	No
Diuron	15-Jan	<0.00003	mg/L	**0.15**	0.075	No
Glyphosate	15-Jan	<0.001	mg/L	**0.28**	0.14	No
Malathion	15-Jan	<0.00002	mg/L	**0.19**	0.095	No
MCPA	15-Jan	<0.00012	mg/L	**0.1**	0.05	No
Metolachlor	15-Jan	<0.00001	mg/L	**0.05**	0.025	No
Metribuzin	15-Jan	<0.00002	mg/L	**0.08**	0.04	No
Monochlorobenzene	15-Jan	<0.0003	mg/L	**0.08**	0.04	No
Paraquat	15-Jan	<0.001	mg/L	**0.01**	0.005	No
Pentachlorophenol	15-Jan	<0.00015	mg/L	**0.06**	0.03	No
Phorate	15-Jan	<0.00001	mg/L	**0.002**	0.001	No
Picloram	15-Jan	<0.001	mg/L	**0.19**	0.095	No
Polychlorinated Biphenyls(PCB)	15-Jan	<0.00004	mg/L	**0.003**	0.0015	No
Prometryne	15-Jan	<0.00003	mg/L	**0.001**	0.0005	No
Simazine	15-Jan	<0.00001	mg/L	**0.01**	0.005	No
THM (latest annual average**)**	2018	0.0338	mg/L	**0.100**	0.05	No
Terbufos	15-Jan	<0.00001	mg/L	**0.001**	0.0005	No
Tetrachloroethylene	15-Jan	<0.00035	mg/L	**0.01**	0.005	No
2,3,4,6-Tetrachlorophenol	15-Jan	**<**0.0002	mg/L	**0.10**	0.05	No
Triallate	15-Jan	<0.00001	mg/L	**0.23**	0.115	No

Parameter	Sample Date	Result Value	Unit of Measure	MAC Level	1/2 MAC Level	Over MAC?
Trichloroethylene	15-Jan	<0.00044	mg/L	**0.005**	0.0025	No
2,4,6-Trichlorophenol	15-Jan	<0.00025	mg/L	**0.005**	0.0025	No
Trifluralin	15-Jan	<0.00002	mg/L	**0.045**	0.0225	No
Vinyl Chloride	15-Jan	<0.00017	mg/L	**0.001**	0.0005	No

Note: Unit of measurement is in milligrams per litre (mg/L), unless stated otherwise.

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

Parameter	Result Value	Unit of Measure	Date of Sample
*			
*			

*Nothing to report at this time.

Section 10 – Summary of Lead Testing

Lead testing is required as per Ontario Regulation 170/03, Schedule 15.1, and requires Municipalities to sample in areas that have a potential for higher lead levels. Since Owen Sound has no known Lead services since 2012, a reduced sampling program has been approved by the Ministry of The Environment, Conservation and Parks (MECP), which only requires testing of the distribution system for Lead every third year.

Location Type	# of Samples	Range of Lead Results (min#) – (max #)	# of Exceedances
Plumbing	n/a	n/a	n/a
Distribution	8	<0.00001-0.00011	0