



## Owen Sound Drinking Water System



## Annual Report 2017

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## 1.0 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 3<sup>rd</sup> Avenue East

City's website - <https://www.owensound.ca/en/city-hall/waterwastewater.aspx>

Public Works office – 1900 20<sup>th</sup> Street East

Water Treatment Plant – 2600 3<sup>rd</sup> Avenue East

Owen Sound & North Grey Union Public Library – 824 1<sup>st</sup> 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	<b>Class 3, Certificate # 20</b> issued September 15th, 2005
Water Distribution Subsystem	<b>Class 3, Certificate # 2094</b> issued September 15th, 2005
Drinking Water Works Permit #	<b>092-201 Issue # 4</b> issued October 6th, 2015
Municipal Drinking Water License	<b>092-101 Issue # 4</b> issued January 10th, 2017
Permit to Take Water #	<b>3044-8SERHC</b> issued March 23rd, 2012 expires March 15, 2022
Period of Report	January 1, 2017 to December 31st, 2017

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

<u>Drinking Water System Owner</u>	<u>Drinking Water System #</u>
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Municipality of Meaford (Leith)	260065312
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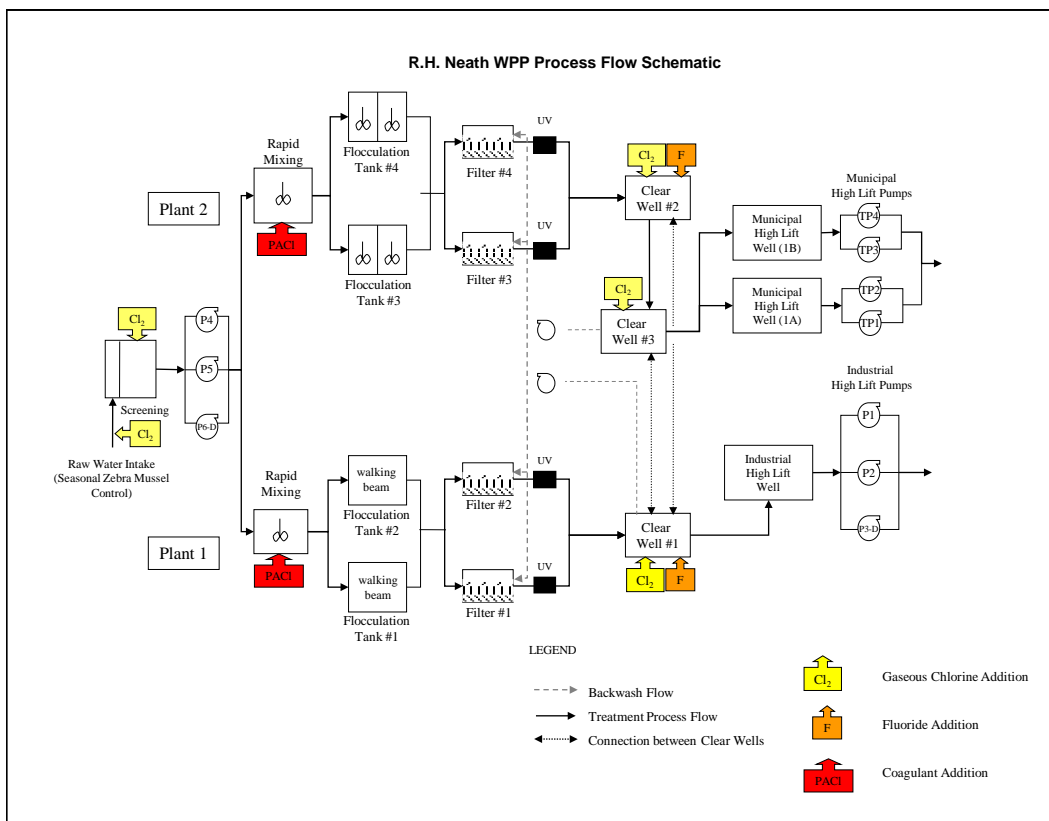
A copy of this report will be provided to Meaford by the end of February.

## 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 22,000 people.

The Water plant comprises of the following processes; raw water screening (removal of larger debris, fish, sticks, 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), and a residue management tank for treating backwash water. See Figure 1 below for a process schematic.

Figure 1



The City has a 22,730 m<sup>3</sup> reservoir, 6 pressure zones (see Figure 2), 150 km of water mains, various pressure reducing valve chambers, 631 City hydrants, 130 private hydrants, and two booster stations that provides addition pressure in the Southeast and southwest portions of the City and outskirts.



## 2.0 Drinking Water Inspections and Audit Summaries

**MOECC Inspection #1**– During 2017, a Ministry of Environment & Climate Change (MOECC) inspection occurred on January 17<sup>th</sup>, 2017, inspection # 1-CNNQN. One recommendation was identified, and this requested the Municipality to look at possible solutions to increase chlorine residuals at one of its sampling locations. Upon the recommendation of this report, contact was made to the business owner to look at creating an internal flushing program to help remediate the issue, as the problem appeared to stem from lack of use at the facility.

The Owen Sound Drinking Water System received a 95.94% on the inspection report card.

**MOECC Inspection #2**– During 2017, a second MOECC inspection occurred on December 14<sup>th</sup>, 2017, inspection # 1-F6KI3. There were two non-compliance items, low chlorine in the distribution system, and a missed UV reference sensor check. On two occasions, chlorine was recorded below 0.05 mg/L. Ongoing flushing at this location has been implemented to eliminate the low residuals. The UV reference sensor check was missed in November 2017, although, it was tested in the frequency spelled out in Ontario Regulation 170/03, a new requirement in the updated MDWL referenced a more strict requirement of testing each calendar month and not the 20-40 days span identified in O Reg 170/03, so this check was missed by several days. This did not affect the operation of the process at all. This has been corrected and will be done each calendar month.

There were three recommendations; backflow prevention, sampling location for testing Haloacetic Acids (HAAs), and review of coagulant pump failures. Backflow prevention will be commented in a separate report to committee, the sampling location for HAAs was changed in January 2018, and the coagulant pump failures were caused by a shorter than expected lifespan on the pump tubing. This will be corrected by replacing the tubing more frequently.

The Owen Sound Drinking Water System received a 95.42% on the inspection report card.

### **Internal Audit/External Audit:**

- **External Audit** - In March 2017, NSF International, performed the external audit. Only one corrective action was required; to document non-conformances separately on Corrective Action Forms.
- **Internal Audit** - In November 2017, an independent consultant (Deb Zehr) undertook the internal audit. No non-conformances were found however some opportunities for improvement were identified. The most significant recommendation was to increase the proportion of the Operational Plan posted on the website.

### 3.0 List of Water Treatment Chemicals Used:

Chlorine Gas (68 kg cylinders) – used in pre chlorination (disinfection before filtration), and post chlorination (disinfection after filtration).

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, making them bigger in size for a higher capture rate during the filtration process.

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, making them bigger in size for a higher capture rate during the filtration process.

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). This occurs after a filter backwash, and also when filters are being prepared for use in the ripening stage before going back online.

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 wastewater plant.

### 4.0 Significant Costs Incurred

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

Item	Description	Cost (\$)
Electric Valve Actuators	Replacement of six (6) Rotork electric actuator for valve control on the filter system	\$35,000
Chlorine Analyzers	Two (2) chlorine analyzers to replace two older units	\$12,600
Particle Counters	Four (4) CHEMTRAC particle counters to replace older units	\$28,000
Coagulant System	Three (3) coagulants to replace two older units and a failed unit.	\$4,000
Valves	Three (3) valves, one 6" pressure relief valve, one 8" gate valve, and one 12" check valve	\$15,000
Lab and Online Equipment	One (1) Lab turbidimeter and one (1) Online turbidimeter	\$8,000
Main rehabilitation	In the 2200 block of the Eddie Sargent Parkway, 150 m of 16" ductile iron pipe was repaired by installing 14" HDPE inside the Ductile Iron pipe.	\$160,000
Broken Watermains	Seventeen (17) broken water mains occurred, estimated repair at \$6,000 each	\$102,000



## 5.0 Adverse Water Quality Incidents reported

#	Reporting Date	AWQI #	Adverse Location	Adverse Parameter	Adverse Result	Units	Remedial Action
1	14-Jan	132232	595 9th Avenue East	Low Pressure	<20	psi	broken water main. Repaired.
2	16-Jan	132236	Water Plant	No coagulant	n/a	n/a	Coagulant pump failure, repaired.
3	12-Feb	132394	Water Plant	Communication failure	n/a	n/a	PLC Fault, program reinstalled.
4	02-Mar	132549	Water Plant	No coagulant	n/a	n/a	Coagulant pump failure, repaired.
5	24-Mar	132720	Stone Tree Hwy 6&10	Low Pressure	<20	psi	Low pressure caused by broken water main.
6	27-Jul	134657	860 8th Avenue 'A' East	Low Free Chlorine	0.01	mg/L	Main flushed and residual restored.
7	04-Aug	135015	860 8th Avenue 'A' East	Low Free Chlorine	0.02	mg/L	Main flushed and residual restored.
8	12-Aug	135305	Water Plant	No coagulant through one filter	n/a	n/a	Coagulant pump failure, replaced with new pump.

## 6.0 Microbiological Test Results

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

Location	Number of Samples	Range of E.coli Or (min #)- (max #)	Range of Total (min #)- (max #)	Number of HPC Samples	Range of HPC (min #)- (max #)
<b>Raw</b>	52	0-100	2-2800	n/a	n/a
<b>Treated</b>	52	0-0	0-0	52	<10-70
<b>Distribution</b>	456	0-0	0-2	113	<10-40

## 7.0 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 #)
<b>Filter 1 Turbidity</b>	8760	<b>0.00 – 4.79 NTU*</b> Low result occurred multiple times in January, February, April, June and December and was caused by a power bump at the water plant. High result occurred February 24 <sup>th</sup> by a power bump. Not a valid reading.



<b>Filter 2 Turbidity</b>	8760	<b>0.00 – 1.09 NTU*</b> Low result occurred multiple times in January, April, June and December and was caused by a power bump at the water plant. High result occurred December 1 <sup>st</sup> by a power bump. Not a valid reading.
<b>Filter 3 Turbidity</b>	8760	<b>0.00 – 2.90 NTU*</b> Low result occurred multiple times in January, February, April, and June, and was caused by a power bump at the water plant. High result occurred February 24 <sup>th</sup> by a power bump. Not a valid reading.
<b>Filter 4 Turbidity</b>	8760	<b>0.00 – 5.18 NTU*</b> Low result occurred multiple times (February/April/December), and was caused by a power bump. High result occurred February 24 <sup>th</sup> by a power bump. Not a valid reading.
<b>Post 1 Chlorine</b>	8760	<b>0.77-3.67</b>
<b>Post 2 Chlorine</b>	8760	<b>0.18-4.27*</b> Low residual dropped briefly, less than 20 seconds and back to normal. Cause unknown. High result caused by backwash, over 4 mg/L for only 2 minutes.
<b>Municipal Chlorine</b>	8760	<b>0.94 – 2.12</b>
<b>Industrial Chlorine</b>	8760	<b>0.82 – 2.27</b>
<b>Municipal Fluoride</b>	8760	<b>0.46 – 0.76</b>
<b>Industrial Fluoride</b>	8760	<b>0.43 – 0.93</b>

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.

## 8.0 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	05-Jan	0	mg/L
Municipal License # 092-101	January 10th, 2017	Aluminum	05-Jan	0.134	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	4	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	02-Apr	0	mg/L
Municipal License # 092-101	January 10th, 2017	Aluminum	05-Apr	0.055	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	04-May	8	mg/L
Municipal License # 092-101	January 10th, 2017	Chlorine – Wastewater System	02-Jun	0	mg/L
Municipal License # 092-101	January 10th, 2017	Chlorine – Wastewater System	07-Jul	0	mg/L
Municipal License # 092-101	January 10th, 2017	Aluminum	05-Jul	0.265	mg/L
Municipal License # 092-101	January 10th, 2017	Total Suspended Solids	02-Aug	5	mg/L
Municipal License # 092-101	January 10th, 2017	Chlorine – Wastewater System	01-Aug	0	mg/L
Municipal License # 092-101	January 10th, 2017	Chlorine – Wastewater System	01-Sep	0	mg/L
Municipal License # 092-101	January 10th, 2017	Aluminum	12-Oct	0.0122	mg/L
Municipal License # 092-101	January 10th, 2017	Total Suspended Solids	01-Nov	6	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	05-Dec	0	mg/L

## 9.0 Inorganic and Organic Testing Summary

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

### Inorganic Parameters

Parameter	Sample Date	Result Value	Unit of Measure	MAC Level	1/2 MAC Level	Exceedance
<b>Antimony</b>	06-Jan	0.00011	mg/L	<b>0.006</b>	0.003	No
<b>Arsenic</b>	06-Jan	0.0002	mg/L	<b>0.025</b>	0.0125	No
<b>Barium</b>	06-Jan	0.0125	mg/L	<b>1.0</b>	0.5	No
<b>Boron</b>	06-Jan	0.018	mg/L	<b>5.0</b>	2.5	No
<b>Cadmium</b>	06-Jan	0.000013	mg/L	<b>0.005</b>	0.0025	No
<b>Chromium</b>	06-Jan	0.0001	mg/L	<b>0.05</b>	0.025	No
<b>Mercury</b>	06-Jan	<0.00001	mg/L	<b>0.001</b>	0.0005	No
<b>Selenium</b>	06-Jan	0.0001	mg/L	<b>0.01</b>	0.005	No
<b>Sodium</b>	5-Feb-18	5.6	mg/L	<b>&gt;20</b>	>10	No
<b>Uranium</b>	06-Jan	0.000087	mg/L	<b>0.02</b>	0.01	No

Fluoride – Municipal	31-Dec	0.54	mg/L	<b>1.50</b>	n/a	No
Fluoride - Industrial	31-Dec	0.51	mg/L	<b>1.50</b>	n/a	No
Nitrite	12-Oct	<0.003	mg/L	<b>1.0</b>	0.5	No
Nitrate	12-Oct	0.247	mg/L	<b>10.0</b>	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?
Aalachlor	05-Jan	<0.00002	mg/L	<b>0.005</b>	0.0025	No
Atrazine + N-dealkylated metabolites	05-Jan	<0.00001	mg/L	<b>0.009</b>	0.0045	No
Azinphos-methyl	05-Jan	<0.00005	mg/L	<b>0.005</b>	0.0025	No
Benzene	05-Jan	<0.00032	mg/L	<b>0.001</b>	0.0005	No
Benzo(a)pyrene	05-Jan	<0.000004	mg/L	<b>0.00001</b>	0.000005	No
Bromoxynil	05-Jan	<0.00033	mg/L	<b>0.005</b>	0.0025	No
Carbaryl	05-Jan	<0.00005	mg/L	<b>0.09</b>	0.045	No
Carbofuran	05-Jan	<0.00001	mg/L	<b>0.09</b>	0.045	No
Parameter	Sample Date	Result Value	Unit of Measure	MAC Level	1/2 MAC Level	Over MAC?
Carbon Tetrachloride	05-Jan	<0.00016	mg/L	<b>0.002</b>	0.001	No
Chlorpyrifos	05-Jan	<0.00002	mg/L	<b>0.09</b>	0.045	No
Diazinon	05-Jan	<0.00002	mg/L	<b>0.02</b>	0.01	No
Dicamba	05-Jan	<0.0002	mg/L	<b>0.12</b>	0.06	No
1,2-Dichlorobenzene	05-Jan	<0.00041	mg/L	<b>0.2</b>	0.1	No
1,4-Dichlorobenzene	05-Jan	<0.00036	mg/L	<b>0.005</b>	0.0025	No
1,2-Dichloroethane	05-Jan	<0.00035	mg/L	<b>0.005</b>	0.0025	No
1,1-Dichloroethylene (vinylidene chloride)	05-Jan	<0.00033	mg/L	<b>0.014</b>	0.007	No
Dichloromethane	05-Jan	<0.00035	mg/L	<b>0.05</b>	0.025	No
2-4 Dichlorophenol	05-Jan	<0.00015	mg/L	<b>0.9</b>	0.45	No
2,4-Dichlorophenoxy acetic acid (2,4-D)	05-Jan	<0.00019	mg/L	<b>0.1</b>	0.05	No
Diclofop-methyl	05-Jan	<0.0004	mg/L	<b>0.009</b>	0.0045	No
Dimethoate	05-Jan	<0.00003	mg/L	<b>0.02</b>	0.01	No
Diquat	05-Jan	<0.001	mg/L	<b>0.07</b>	0.035	No
Diuron	05-Jan	<0.00003	mg/L	<b>0.15</b>	0.075	No

Glyphosate	05-Jan	<0.001	mg/L	<b>0.28</b>	0.14	No
Malathion	05-Jan	<0.00002	mg/L	<b>0.19</b>	0.095	No
MCPA	05-Jan	<0.00012	mg/L	<b>0.1</b>	0.05	No
Metolachlor	05-Jan	<0.00001	mg/L	<b>0.05</b>	0.025	No
Metribuzin	05-Jan	<0.00002	mg/L	<b>0.08</b>	0.04	No
Monochlorobenzene	05-Jan	<0.0003	mg/L	<b>0.08</b>	0.04	No
Paraquat	05-Jan	<0.001	mg/L	<b>0.01</b>	0.005	No
Pentachlorophenol	05-Jan	<0.00015	mg/L	<b>0.06</b>	0.03	No
Phorate	05-Jan	<0.00001	mg/L	<b>0.002</b>	0.001	No
Picloram	05-Jan	<0.001	mg/L	<b>0.19</b>	0.095	No
Polychlorinated Biphenyls(PCB)	05-Jan	<0.00004	mg/L	<b>0.003</b>	0.0015	No
Prometryne	05-Jan	<0.00003	mg/L	<b>0.001</b>	0.0005	No
Simazine	05-Jan	<0.00001	mg/L	<b>0.01</b>	0.005	No
THM (latest annual average)	2017	0.041	mg/L	<b>0.100</b>	0.05	No
Terbufos	05-Jan	<0.00001	mg/L	<b>0.001</b>	0.0005	No
Tetrachloroethylene	05-Jan	<0.00035	mg/L	<b>0.01</b>	0.005	No
2,3,4,6-Tetrachlorophenol	05-Jan	<0.0002	mg/L	<b>0.10</b>	0.05	No
Triallate	05-Jan	<0.00001	mg/L	<b>0.23</b>	0.115	No
<b>Parameter</b>	<b>Sample Date</b>	<b>Result Value</b>	<b>Unit of Measure</b>	<b>MAC Level</b>	<b>1/2 MAC Level</b>	<b>Over MAC?</b>
Trichloroethylene	05-Jan	<0.00044	mg/L	<b>0.005</b>	0.0025	No
2,4,6-Trichlorophenol	05-Jan	<0.00025	mg/L	<b>0.005</b>	0.0025	No
Trifluralin	05-Jan	<0.00002	mg/L	<b>0.045</b>	0.0225	No
Vinyl Chloride	05-Jan	<0.00017	mg/L	<b>0.001</b>	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.

## 10.0 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 MOECC, which only requires testing of the distribution system for Lead every third year.

This changed slightly in January 2017, when a revised Municipal Drinking Water License was issued requiring two sets (1 year period) of Lead sampling in residential, commercial and the distribution system. Two sets were completed with no exceedances to report. In 2018, we will revert back to just testing the distribution system for Lead every third year. Below are the results from last years testing;

Location Type	# of Samples	Range of Lead Results (min#) – (max #)	# of Exceedances
<b>Plumbing</b>	34	0.00004-0.00119	0
<b>Distribution</b>	6	<0.00001-0.0003	0