



Owen Sound Drinking Water System



Annual Report 2023

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Section 1 – Drinking Water System General Information

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

This report must 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 – 808 2nd 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 #	092-202 Issue # 5 issued October 2nd, 2020
Municipal Drinking Water License	094-101 Issue # 5 issued October 2nd, 2020
Permit to Take Water #	P-300-8173611786 Issued May 28, 2022, Expires Mar 31, 2032
Period of Report	2023

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>
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

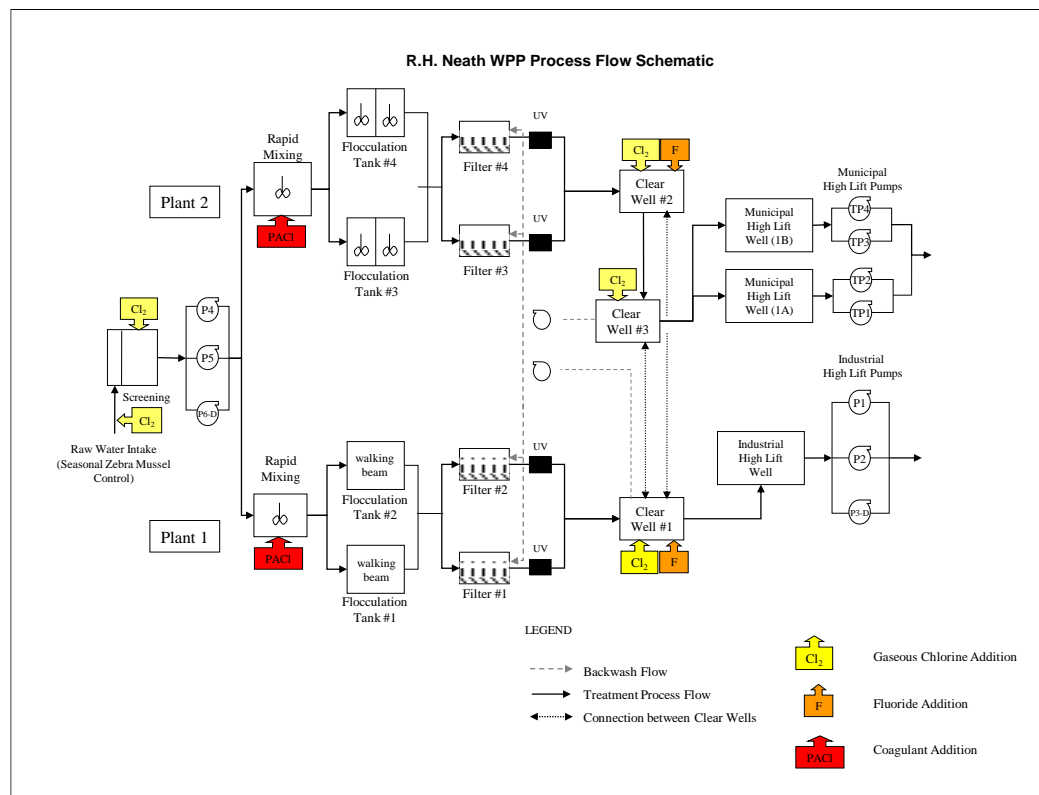
The Richard H. Neath Water Purification plant is a direct filtration surface water treatment plant that draws its water from Georgian Bay. This plant serves a population of approximately 22,000 people.

The Water plant comprises of the following processes:

- Raw water screening (removal of larger debris, fish, etc.),
- Pre-chlorination (initial application of chlorine to the raw water),
- Zebra mussel control (chlorination at Intake during warmer months only, raw temperature above 10°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 in the water throughout the distribution system),
- Fluoridation (added in the two main treated water wells),
- Residue management tank for treating backwash wastewater.

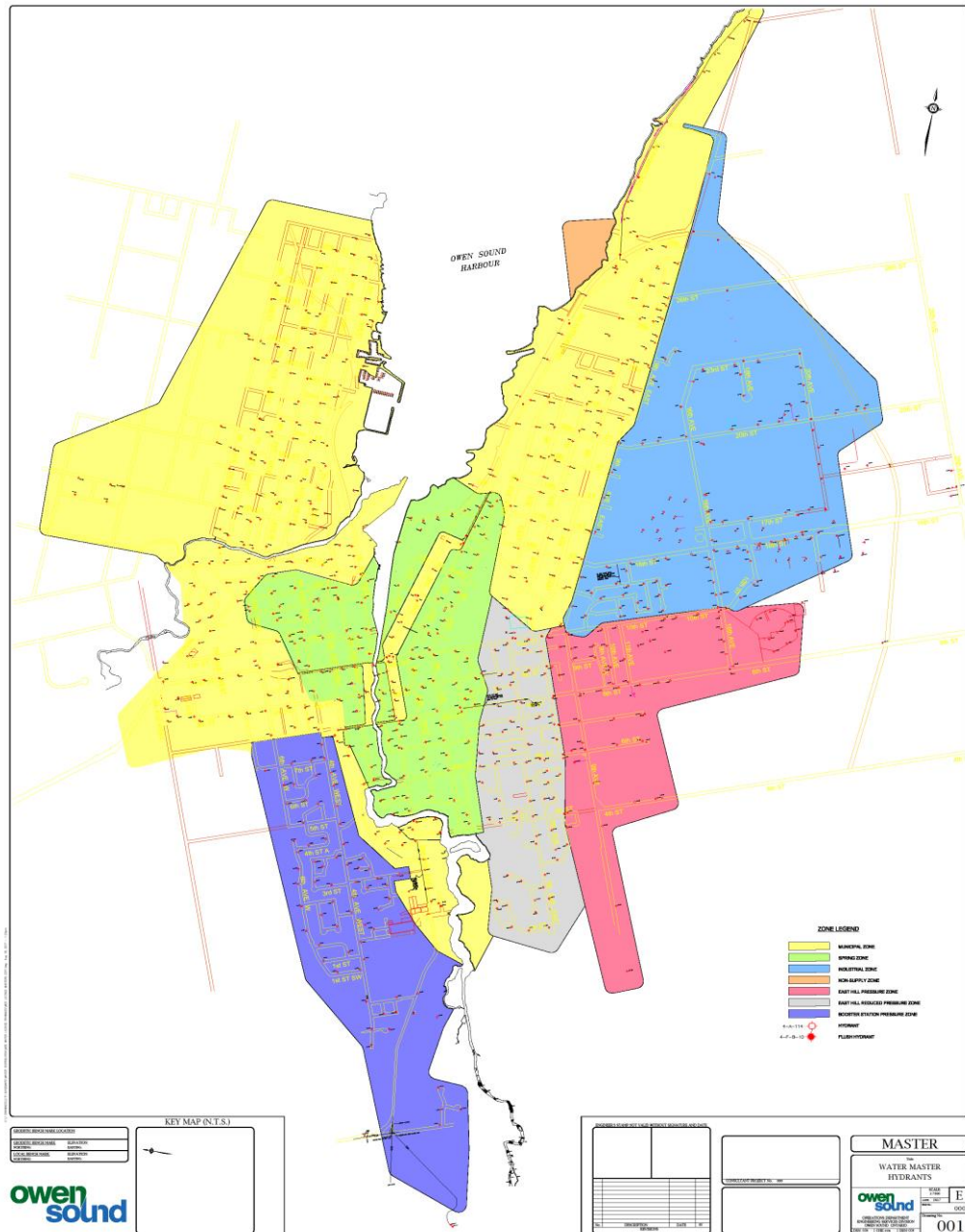
See Figure 1 below for a process schematic.

Figure 1



The City has a 22,000 m³ reservoir, six (6) pressure zones (see Figure 2), 160.6 km of water mains, 11 pressure reducing /sustaining chambers, 10 check valve chambers, 675 City hydrants, 142 private hydrants, 61 flush hydrants/blow-offs/auto flushing units, 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 2023, there was one MECP inspection completed in March. The City received 100.0% on the Inspection report card.

2. Internal Audit/External Audit

Internal Audit – Brigitte Roth, an independent auditor, evaluated our Drinking Water Quality Management System (DWQMS) in December 2023. 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 DWQMS.

There were no non-conformances identified, and eight (8) opportunities for improvement (OFIs) were identified in the audit. These opportunities will be reviewed and actioned as appropriate.

External Audit – In April 2023, NSF International performed the external audit and found no major non-conformances, no minor non-conformances, and three OFIs. The OFIs were reviewed, and changes were made.

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** – a coagulant used prior to filtration in the colder months (<10°C). A coagulant's primary objective is to adhere to suspended particulates and make them bigger in size, to facilitate a higher removal rate of particulates in filtration.
- 3. PAX XL-1900** – a coagulant used prior to filtration in the warmer months (>10°C). A coagulant's primary objective is to adhere to suspended particulates and make them bigger in size to allow a higher removal rate of particulates in the filtration process.
- 4. Sodium Bisulphite** – 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 wastewater plant.

Section 4 – Significant Costs Incurred

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

Water Treatment

Item	Description	Cost (\$)
UV Bulbs	UV Lamps for 4 UV reactors.	\$17,000
Capital Work - Hydraulic Lift	New Hydraulic lift installed at WTP	\$30,000
Capital Work – Flocculator Repair	Filter 1 Flocculator Failed – Flocculator to be rebuilt	\$25,000
Capital Work – UV System	New UV system ordered – Installation in 2024; total cost of the UV system approx. \$600,000. This will commence along with Filter Upgrades	\$92,000
Capital Project – Filter Upgrade	Filter Upgrade consisting of new underdrains, air scour technology, new media, new backwash pumps, and some piping upgrades – Multi-year project – Completion date Mid-2024; this is a \$4,000,000 project.	\$260,000

Water Distribution

Item	Description	Cost (\$)
Capital Work - New Watermain	Watermain Looping Project – Moorefield 8 th St E to 6 th St E	\$794,000 ±
Capital Work – New Watermain	6 th Ave West from 21 st St W to 22 nd St W – R.F. King	\$295,000
2023 Leak Survey	Approximately 159 km of Watermain and Hydrants Sounded	\$9,435.50
Capital Work – Cathodic Protection	New cathodic protection installed throughout the City	\$110,000
Capital Work – New Watermain	Watermain Looping 2” PVC 17 th St W from 5 th Ave W to top of Hill	\$59,250
Broken Watermains	20 incidents of watermain breaks, estimated repair of \$7,000 each ±	\$140,000
Capital Work - New Watermain	22 nd St West/6 th Ave W Relay intersection and 4 new Valves	\$31,580
Capital Work – Watermain Work in Support of Paving	- Valve repair/replacement in various areas - 22 nd Street West/6 th Ave West intersection relayed - 17 th St W 2” Looping and Service connections	\$100,000

Section 5 – Reported Adverse Water Quality Incidents

#	Report Date	AWQI #	Adverse Location	Adverse Parameter	Adverse Result	Units	Remedial Action
1	25-Feb	161394	WTP	Coagulant Pump Failure	n/a	n/a	Tube failure. System shut down in 3 minutes. Tubing replaced.
2	03-Apr	161656	WTP	Coagulant Pump Failure	n/a	n/a	Tube failure. System shut down after 2 minutes. Tubing replaced.
3	13-Jun	162199	WTP	Coagulant Pump Failure	n/a	n/a	Tube failure. System shut down in 3 minutes. Tubing replaced.
4	18-Sep	163504	Distribution	Low Chlorine	0.01	mg/L	Low chlorine was detected on a dead-end watermain. Monitoring of water quality was increased.
5	01-Nov	163937	WTP	Power Bump causing UV shutdown	n/a	n/a	Multiple power bumps in short period of time caused water to go through UV reactor with no power for several minutes.

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 – 3	0-540	n/a	n/a
Treated	52	0-0	0-0	52	<10- 20
Distribution	468	0-0	0-0	108	<10 - 10

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	0.01 NTU – 1.01 NTU* High turbidity occurred on December 11 th , and was caused by work being done on Filter 1 particle counter. False high reading.
Filter 2 Turbidity	8760	0.01 NTU – 5.00 NTU* High turbidity occurred twice, October 24 th and was caused by troubleshooting a flow issue through turbidimeter, and the second occurred on December 7 th while a new particle counter was being installed. Both instances were false high readings. Both over 1 NTU for approximately 2 minutes, 30 seconds.
Filter 3 Turbidity	8760	0.01 NTU – 0.28 NTU
Filter 4 Turbidity	8760	0.01 NTU – 1.24 NTU * High turbidity spike occurred September 27 th , and was over 1 NTU for 24 seconds.
Post 1 Chlorine	8760	0.16 – 3.38* low occurred September 26 th , due to a power issue with UPS. This was rectified in a few minutes.
Post 2 Chlorine	8760	0.00 – 4.77 * The low occurred February 17 th and March 23 rd , one was an analyzer maintenance issue and the second was just down for maintenance, and the High level occurred on November 10 th , during a backwash, was only over 4 mg/L for just under 10 minutes.
Municipal Chlorine	8760	1.34 – 2.23
Industrial Chlorine	8760	1.15 – 2.49
Municipal Fluoride	8760	0.18 – 2.06 – Low residual was caused by a pump wiring issue on February 9 th . High Fluoride was caused by a sensor issue and lasted 20 seconds. This occurred several times March 14 th , March 26 th , Apr 4 th , May 24 th , and Aug 2 nd
Industrial Fluoride	8760	0.00 – 1.08 – Low residual caused by a pump wiring issue on February 9 th .

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 # 094-101	October 2 nd , 2020	Chlorine – Wastewater System	01-Jan	0.00	mg/L
Municipal License # 094-101	October 2 nd , 2020	Aluminum	11-Jan	0.139	mg/L
Municipal License # 094-101	October 2 nd , 2020	Chlorine – Wastewater System	04-Feb	0.00	mg/L
Municipal License # 094-101	October 2 nd , 2020	Total Suspended Solids	04-Feb	4.4	mg/L
Municipal License # 094-101	October 2 nd , 2020	Chlorine – Wastewater System	02-Mar	0.00	mg/L
Municipal License # 094-101	October 2 nd , 2020	Chlorine – Wastewater System	03-Apr	0.00	mg/L
Municipal License # 094-101	October 2 nd , 2020	Aluminum	11-Apr	0.055	mg/L
Municipal License # 094-101	October 2 nd , 2020	Total Suspended Solids	6-May	6	mg/L
Municipal License # 094-101	October 2 nd , 2020	Chlorine – Wastewater System	6-May	0.00	mg/L
Municipal License # 094-101	October 2 nd , 2020	Chlorine – Wastewater System	01-Jun/05-Jun	0.00	mg/L
Municipal License # 094-101	October 2 nd , 2020	Chlorine – Wastewater System	04-Jul	0.00	mg/L
Municipal License # 094-101	October 2 nd , 2020	Aluminum	10-Jul	0.063	mg/L
Municipal License # 094-101	October 2 nd , 2020	Total Suspended Solids	02-Aug	7	mg/L
Municipal License # 094-101	October 2 nd , 2020	Chlorine – Wastewater System	02-Aug	0.00	mg/L
Municipal License # 094-101	October 2 nd , 2020	Chlorine – Wastewater System	05-Sep	0.00	mg/L
Municipal License # 094-101	October 2 nd , 2020	Chlorine – Wastewater System	02-Oct	0.00	mg/L
Municipal License # 094-101	October 2 nd , 2020	Aluminum	16 Oct	0.018	mg/L
Municipal License # 094-101	October 2 nd , 2020	Chlorine – Wastewater System	3-Nov	0.00	mg/L
Municipal License # 094-101	October 2 nd , 2020	Total Suspended Solids	3-Nov	1.0	mg/L
Municipal License # 094-101	October 2 nd , 2020	Chlorine – Wastewater System	6-Dec	0.00	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	11-Jan	<0.0006	mg/L	0.006	0.003	No
Arsenic	11-Jan	<0.0002	mg/L	0.01	0.005	No
Barium	11-Jan	0.0118	mg/L	1.0	0.5	No
Boron	11-Jan	0.015	mg/L	5.0	2.5	No
Cadmium	11-Jan	<0.000003	mg/L	0.005	0.0025	No
Chromium	11-Jan	0.0001	mg/L	0.05	0.025	No
Mercury	11-Jan	<0.00001	mg/L	0.001	0.0005	No
Selenium	11-Jan	0.00007	mg/L	0.05	0.025	No
Sodium	13-Feb-23	9.53	mg/L	>20	>10	No
Uranium	11-Jan	0.000136	mg/L	0.02	0.01	No
Fluoride – Municipal	31-Dec	0.77	mg/L	1.50	n/a	No
Fluoride - Industrial	31-Dec	0.70	mg/L	1.50	n/a	No
Nitrite	16-Oct	<0.003	mg/L	1.0	0.5	No
Nitrate	16-Oct	0.227	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	11-Jan	<0.00002	mg/L	0.005	0.0025	No
Atrazine + N-dealkylated metabolites	11-Jan	<0.00001	mg/L	0.005	0.0025	No
Azinphos-methyl	11-Jan	<0.00005	mg/L	0.02	0.01	No
Benzene	11-Jan	<0.00032	mg/L	0.001	0.0005	No
Benzo(a)pyrene	11-Jan	<0.00000 4	mg/L	0.0000 1	0.000005	No
Bromoxynil	11-Jan	<0.00033	mg/L	0.005	0.0025	No
Carbaryl	11-Jan	<0.00005	mg/L	0.09	0.045	No
Carbofuran	11-Jan	<0.00001	mg/L	0.09	0.045	No
Carbon Tetrachloride	11-Jan	<0.00017	mg/L	0.002	0.001	No
Chlorpyrifos	11-Jan	<0.00002	mg/L	0.09	0.045	No
Diazinon	11-Jan	<0.00002	mg/L	0.02	0.01	No
Dicamba	11-Jan	<0.0002	mg/L	0.12	0.06	No
1,2-Dichlorobenzene	11-Jan	<0.00041	mg/L	0.2	0.1	No
1,4-Dichlorobenzene	11-Jan	<0.00036	mg/L	0.005	0.0025	No
1,2-Dichloroethane	11-Jan	<0.00035	mg/L	0.005	0.0025	No
1,1-Dichloroethylene (vinylidene chloride)	11-Jan	<0.00033	mg/L	0.014	0.007	No
Dichloromethane	11-Jan	<0.00035	mg/L	0.05	0.025	No
2-4 Dichlorophenol	11-Jan	<0.00015	mg/L	0.9	0.45	No
2,4-Dichlorophenoxy acetic acid (2,4-D)	11-Jan	<0.00019	mg/L	0.1	0.05	No
Diclofop-methyl	11-Jan	<0.0004	mg/L	0.009	0.0045	No
Dimethoate	11-Jan	<0.00006	mg/L	0.02	0.01	No
Diquat	11-Jan	<0.001	mg/L	0.07	0.035	No
Diuron	11-Jan	<0.00003	mg/L	0.15	0.075	No
Glyphosate	11-Jan	<0.001	mg/L	0.28	0.14	No
Malathion	11-Jan	<0.00002	mg/L	0.19	0.095	No
MCPA	11-Jan	<0.00012	mg/L	0.1	0.05	No
Metolachlor	11-Jan	<0.00001	mg/L	0.05	0.025	No
Metribuzin	11-Jan	<0.00002	mg/L	0.08	0.04	No

Monochlorobenzene	11-Jan	<0.0003	mg/L	0.08	0.04	No
Paraquat	11-Jan	<0.001	mg/L	0.01	0.005	No
Pentachlorophenol	11-Jan	<0.00015	mg/L	0.06	0.03	No
Phorate	11-Jan	<0.00001	mg/L	0.002	0.001	No
Picloram	11-Jan	<0.001	mg/L	0.19	0.095	No
Polychlorinated Biphenyls(PCB)	11-Jan	<0.00004	mg/L	0.003	0.0015	No
Prometryne	11-Jan	<0.00003	mg/L	0.001	0.0005	No
Simazine	11-Jan	<0.00001	mg/L	0.01	0.005	No
THM (latest annual average)	2023	0.0445	mg/L	0.100	0.05	No
Terbufos	11-Jan	<0.00001	mg/L	0.001	0.0005	No
Tetrachloroethylene	11-Jan	<0.00035	mg/L	0.01	0.005	No
2,3,4,6-Tetrachlorophenol	11-Jan	<0.0002	mg/L	0.10	0.05	No
Triallate	11-Jan	<0.00001	mg/L	0.23	0.115	No
Trichloroethylene	11-Jan	<0.00044	mg/L	0.005	0.0025	No
2,4,6-Trichlorophenol	11-Jan	<0.00025	mg/L	0.005	0.0025	No
Trifluralin	11-Jan	<0.00002	mg/L	0.045	0.0225	No
Vinyl Chloride	11-Jan	<0.00017	mg/L	0.001	0.0005	No
Haloacetic Acids (latest annual average)	2023	0.0297	mg/L	0.08	.04	No

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

*Nothing to report at this time.

Section 10 – Summary of Lead Testing

As per Ontario Regulation 170/03, Schedule 15.1, Lead Testing, requires Municipalities to sample in areas with 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 MECP, which only requires testing of the distribution system for Lead every third year. 2023 was a year to test the distribution system only for alkalinity and pH.

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