

Brechin and Lagoon City Drinking Water System

Waterworks # 210001273
System Category – Large Municipal Residential

Annual Water Report

Prepared For: The Township of Ramara

Reporting Period of January 1st – December 31st, 2023

Issued: February 27, 2024

Revision: 0

Operating Authority:



This report has been prepared to satisfy the annual reporting requirements in O. Reg. 170/03 Section 11 and Schedule 22

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Report Availability

This system does not serve more than 10,000 residence and the annual reports will be available to residents at the Township Of Ramara Administration Office and on the Township’s website at www.ramara.ca. Notification that reports are available free of charge will be made on the Township of Ramara website. The Township of Ramara Administration Office is located at 2297 Highway 12, Brechin, ON L0K 1B0.

Compliance Report Card

Drinking Water System Number: 210001273

Drinking Water System Name: Brechin and Lagoon City DWS

Drinking Water System Owner: Township of Ramara

Drinking Water System Category: Large Municipal Residential

Period Being Reported: January 1, 2023 - December 31, 2023

	# of Events	Date	Details
Health & Safety			
Number of Incidents	0		
Drinking Water			
MECP Inspections	0		Inspection for 2023/2024 inspection cycle completed in January 2024. Final inspection rating not available at time of report issuance.
AWQI's	2	January 3, 2023	Filter #1 and Filter #2 effluent turbidity greater than 1.0 NTU for a period greater than 15 minutes while in production (total of 18 minutes)
		January 2023	Monthly filter performance criterion not met.
Number of Non-Compliances	0		
Number of Boil Water Advisories	0		

System Process Description

Raw Source

The Brechin and Lagoon City DWS is supplied with surface water from Lake Simcoe.

Treatment

The treatment system is a dual train direct filtration package plant consisting of the following:

- Raw water is sourced from Lake Simcoe through an intake well with two (2) removable screens further the low lift pumping station consisting of three (3) low lift pumps
- Inlet line connected to sodium hypochlorite and a coagulant feed line diffuser
- Raw water flow meter and turbidity analyzer
- Carbon Dioxide injection system for adjusting pH to optimize coagulation process with a metering panel equipped with actuated control valve and bypass piping, gas feed flowmeter, filter, carbon dioxide gas pressure regulator and isolating manual ball valves
- Coagulant is added to the raw water intake well at the low lift pumping station
- Four (4) spiral flow flocculation tanks allows for floc to settle
- Two (2) filter-absorber units each consisting of granular activated carbon over sand and gravel with three backwash troughs and two surface water agitators and an underdrain
- Continuously monitoring turbidity analyzers on each filter line
- Waste backwash holding tank with discharge to sanitary sewer
- Chlorine injection system
- Single in-ground clearwell with five (5) highlift pumps
- Chlorine residual and pH analyzers prior to distribution connection
- Water tower
- SCADA computer control system
- Standby power generator

Treatment Chemicals used during the reporting year:

Chemical Name	Use	Supplier
Sodium Hypochlorite	Disinfection	Brenntag
Poly-Aluminum Chloride	Flocculation	Brenntag
Carbon Dioxide	pH Optimization	Praxair

Summary of Non-Compliance

Adverse Water Quality Incidents

Date	AWQI #	Location	Problem	Details	Legis-lation	Corrective Action Taken
January 3, 2023	161085	Facility	Filter effluent turbidity greater than 1.0 NTU for	Filter #1 and Filter #2 effluent turbidity greater than 1.0 NTU for a period greater	O. Reg 170/03	Due to severe weather conditions the raw water quality was poor. Filters were

Date	AWQI #	Location	Problem	Details	Legislation	Corrective Action Taken
			a period greater than 15 minutes while in production	than 15 minutes while in production (Filter #1 – 23 minutes total. Filter #2 – 73 minutes total)		taken offline, coagulant dosage was increased to try to accommodate the raw water quality.
January 2023	161276	Facility	Performance criterion for filtered water not met for month of January.	Filter #1 achieved ≤ 0.3 NTU for 88% of month of January. Filter #2 achieved ≤ 0.3 NTU for 89% of the month.	O. Reg 170/03	Due to severe weather conditions the raw water quality was poor. Coagulant dosage was increased and jar testing performed. Once raw water quality improved, filter performance returned to normal.

Non-Compliance

Legislation	Requirement(s) system failed to meet	Duration of the failure (i.e. date(s))	Corrective Action	Status
There were no non-compliances during the reporting period.				

Non-Compliance Identified in a Ministry Inspection:

Legislation	Requirement(s) system failed to meet	Duration of the failure (i.e. date(s))	Corrective Action	Status
There were no Ministry inspections during the reporting period.				

Flows

The Brechin and Lagoon City Drinking Water System is operating on average under half the rated capacity. Although the system is typically operating well under design capacity, significant weather events like snowmelt and rainfall create major operational challenges seasonally at the facility. The plant is unable to handle the substantial changes in raw water characteristics caused by these events, such as turbidity and colour. As a result, the facility cannot produce water at a rate that can meet demand during these times potentially compromising water supply, system pressure and fire

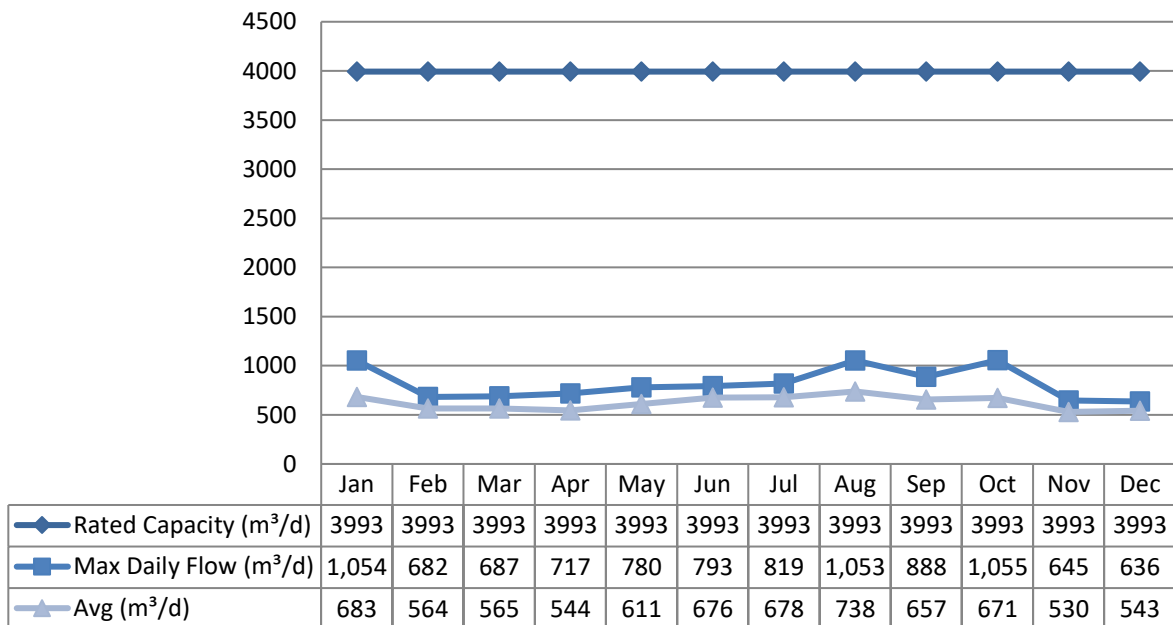
protection. During the snowmelt event in January 2023, the plant was close to needing water hauled in from an alternate source to supplement the system.

Raw Water Flows

The Permit to Take Water compliance criteria is in litres per minute (L/min) but for the purposes of this report the flow rate is reported in litres per second (L/sec) based on industry standard for flow monitoring recording. The Raw Water flows are regulated under the Permit to Take Water. 2023 Raw Flow Data was submitted to the Ministry electronically under permit #0278-AQ4LYS. The confirmation and a copy of the data that was submitted are attached in Appendix A.

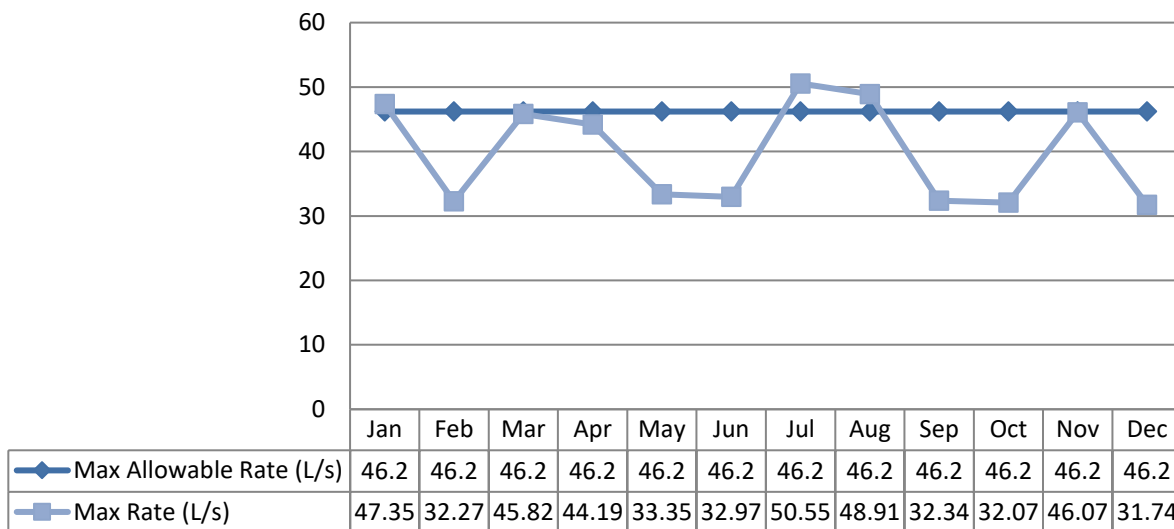
Total Monthly Flows (m³/d)

Max Allowable PTTW –Raw



Monthly Rated Flows (L/s)

Max allowable rate – PTTW –Raw



Note: The above table shows there were exceedances in instantaneous peak flow rate (L/s) caused by a communication blip in the local PLC as well as on pump start-up. All spikes are reviewed for compliance.

Treated Water Flows

The Treated Water flows are regulated under the Municipal Licence. The average water consumption for the Brechin/Lagoon City Drinking Water System during 2023 was: 636 m³/day.

Brechin Lagoon City Drinking Water System Historical Demands

Year	Number of Connections	Average Daily Demand (m ³)	Maximum Daily Demand (m ³ /day)	Rated Capacity	Per Capita Consumption* (L/p/day)	
					Average	Maximum
2013	1258	770	1411	4000	296	542
2014	1258	783	1239	4000	297	476
2015	1261	781	1670	4000	299	639
2016	1264	837	1546	4000	320	591
2017	1269	699	1207	4000	266	459
2018	1273	870	1829	4000	329	694
2019	1274	893	1798	4000	317	681
2020	1279	676	1333	4000	242	644
2021	1279	684	1090	4000	245	390
2022	1286	719	1246	4000	269	467
2023	1288	636	1072	4000	238	401
3 Year Average/Max		679	1246	4000	251	467

*Based on estimated service connections in Lagoon City and Brechin: 1,132 and 156 single family dwellings. The estimated population in Lagoon City: 2,264 (based on a population density of 2.0 persons per dwelling), and the estimated population in Brechin: 406 (based on a population density of 2.6 persons per dwelling). Assumptions made on location of new developments for 2023 connections for population estimation.

Note: Excluding pipe leaks/breaks & system flushing

Note: This calculation was completed based on current connections in the system, growth within the drinking water system has not been considered.

System Reserve Capacity

In accordance with the MECP Procedure D-5-1, the reserve capacity is calculated by the following formula:

Reserve Capacity= Design Flow- Committed Flow

Design flow is the maximum permissible flow approved by the MDWL and/or PTTW. Brechin Lagoon City Water Works maximum daily rated capacity is 4000 m³/day.

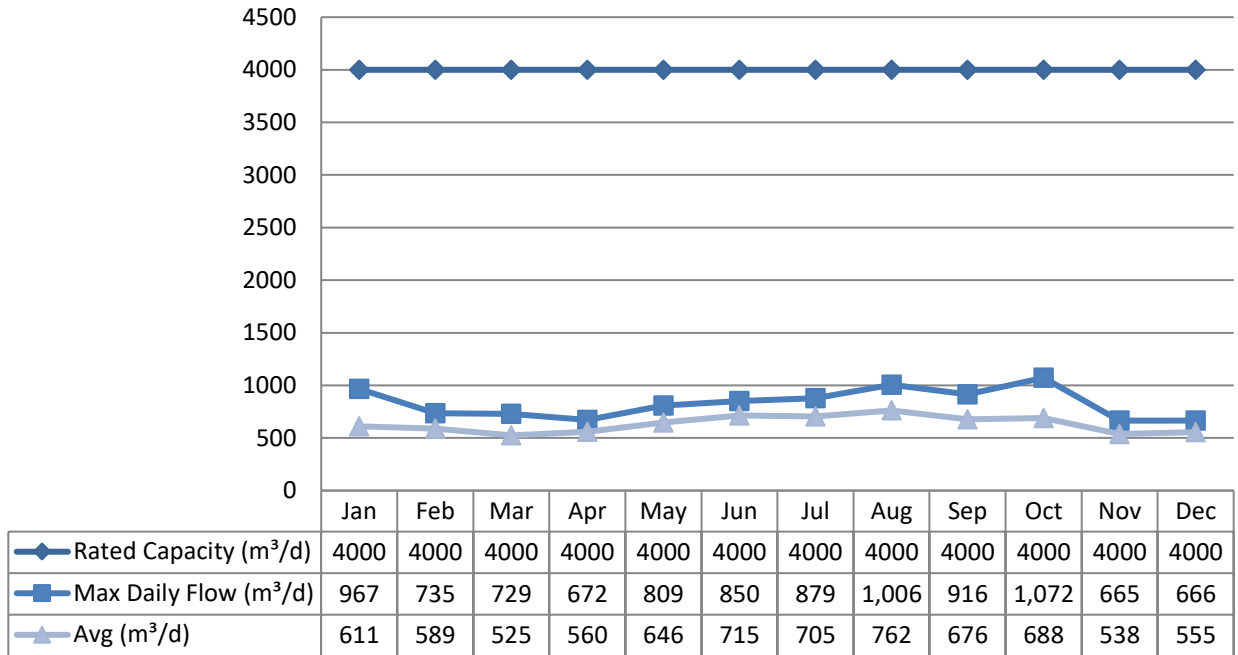
The committed flow is the total expected water demand from the existing and proposed connections based on the previous three years of data. The committed number of service connections is: 1367. The committed population used for this calculation is 2871 (based on an average population density of 2.1 persons per dwelling). The three-year (2021-2023) maximum per capita water consumption is: 644 L/p/day. At this water consumption rate, the committed flow is: 1849 m³/day.

As a result, the calculated reserve capacity is: 2151 m³/day*.

***Note:** The reserve capacity calculation is based off of facility design criteria and does not take into consideration recent operational challenges.

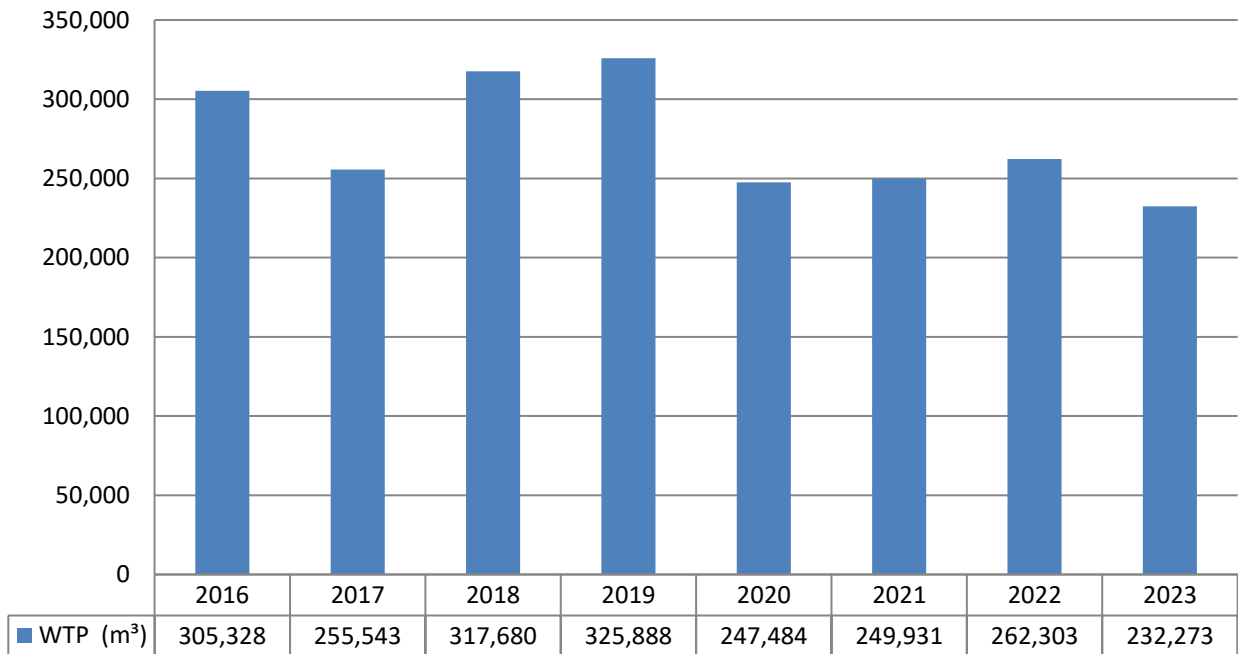
Monthly Rated Flows

Rated Capacity – MDWL



Annual Total Flow Comparison

Total Annual m³



Regulatory Sample Results Summary

Microbiological Testing

	No. of Samples Collected	Range of E. Coli Results		Range of Total Coliform Results		Range of HPC Results	
		Min	Max	Min	Max	Min	Max
Raw	52	0	30	0	144*		
Treated	54	0	0	0	0	0	3
Distribution	161	0	0	0	0	0	6

*Note: Three result for raw water resulted in Total Coliform and E. Coli as NDOGT (No Data: Overgrown with Target Bacteria).

Operational Testing

	No. of Samples Collected	Range of Results	
		Minimum	Maximum
Turbidity – Filter Line 1 (NTU)	8760	0.00	2.01
Turbidity – Filter Line 2 (NTU)	8760	0.00	2.01
Turbidity-Treated (NTU)	8760	0.00	2.01
Treated Water Chlorine	8760	0.00	5.17
Distribution Water Chlorine	365	0.70	2.41
Fluoride (If the DWS provides fluoridation)	N/A	N/A	N/A

Note: Record the unit of measure if it is **not** milligrams per litre.

Note: For continuous monitors 8760 is used as the number of samples. Spikes recorded by on-line instrumentation were a result of air bubbles and various maintenance/calibration activities. All spikes are reviewed for compliance with O. Reg. 170/03.

Inorganic Parameters

These parameters are tested as a requirement under O. Reg. 170/03. Sodium and Fluoride are required to be tested every 5 years. Nitrate and Nitrite are tested quarterly and the metals are tested annually as required under O. Reg. 170/03. In the event any of the parameters exceed half of the maximum allowable concentration the parameter is required to be sampled quarterly.

- MAC = Maximum Allowable Concentration as per O. Reg. 169/03
- MDL = Method Detection Limit

	Sample Date (yyyy/mm/dd)	Sample Result	MAC	Exceedances	
				MAC	1/2 MAC
Treated Water					
Antimony: Sb (ug/L) - TW	2023/08/14	<MDL 0.6	6.0	No	No
Arsenic: As (ug/L) - TW	2023/08/14	0.3	10.0	No	No
Barium: Ba (ug/L) - TW	2023/08/14	28.5	1000.0	No	No

	Sample Date (yyyy/mm/dd)	Sample Result	MAC	Exceedances	
				MAC	1/2 MAC
Boron: B (ug/L) - TW	2023/08/14	20.0	5000.0	No	No
Cadmium: Cd (ug/L) - TW	2023/08/14	<MDL 0.003	5.0	No	No
Chromium: Cr (ug/L) - TW	2023/08/14	0.20	50.0	No	No
Mercury: Hg (ug/L) - TW	2023/08/14	<MDL 0.01	1.0	No	No
Selenium: Se (ug/L) - TW	2023/08/14	0.12	50.0	No	No
Uranium: U (ug/L) - TW	2023/08/14	0.19	20.0	No	No
Additional Inorganics					
Fluoride (mg/L) - TW	2022/08/03	<MDL 0.06	1.5	No	No
Nitrite (mg/L) - TW	2023/02/06	<MDL 0.003	1.0	No	No
Nitrite (mg/L) - TW	2023/05/01	<MDL 0.003	1.0	No	No
Nitrite (mg/L) - TW	2023/08/01	<MDL 0.003	1.0	No	No
Nitrite (mg/L) - TW	2023/11/06	<MDL 0.003	1.0	No	No
Nitrate (mg/L) - TW	2023/02/06	0.241	10.0	No	No
Nitrate (mg/L) - TW	2023/05/01	0.171	10.0	No	No
Nitrate (mg/L) - TW	2023/08/01	0.036	10.0	No	No
Nitrate (mg/L) - TW	2023/11/06	0.063	10.0	No	No
Sodium: Na (mg/L) - TW	2020/08/12	34.8	20*	Yes	Yes
Sodium: Na (mg/L) - TW	2020/08/24	31.5	20*	Yes	Yes

*There is no "MAC" for Sodium. The aesthetic objective for sodium in drinking water 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.

Schedule 15 Sampling:

The Schedule 15 Sampling is required under O. Reg. 170/03. This system is under reduced sampling. No plumbing samples were collected.

Distribution System	Number of Samples	Range of Results Minimum	Range of Results Maximum	MAC (ug/L)	Number of Exceedances
Alkalinity (mg/L)	4	107	124	N/A	N/A
pH	4	7.4	8.31	N/A	N/A
Lead (ug/l)	0	-	-	10	0

Note: Lead is required to be sampled every 3 years and was last sampled in 2022.

Organic Parameters

These parameters are tested annually as a requirement under O.Reg 170/03. In the event any of the parameters exceed half of the maximum allowable concentration the parameter is required to be sampled quarterly.

	Sample Date (yyyy/mm/dd)	Sample Result	MAC	Number of Exceedances	
				MAC	1/2 MAC
Treated Water					
Alachlor (ug/L) - TW	2023/08/14	<MDL 0.02	5.00	No	No
Atrazine + N-dealkylated metabolites (ug/L) - TW	2023/08/14	0.02	5.00	No	No
Azinphos-methyl (ug/L) - TW	2023/08/14	<MDL 0.05	20.00	No	No
Benzene (ug/L) - TW	2023/08/14	<MDL 0.32	1.00	No	No
Benzo(a)pyrene (ug/L) - TW	2023/08/14	<MDL 0.004	0.01	No	No
Bromoxynil (ug/L) - TW	2023/08/14	<MDL 0.33	5.00	No	No
Carbaryl (ug/L) - TW	2023/08/14	<MDL 0.05	90.00	No	No
Carbofuran (ug/L) - TW	2023/08/14	<MDL 0.01	90.00	No	No
Carbon Tetrachloride (ug/L) - TW	2023/08/14	<MDL 0.17	2.00	No	No
Chlorpyrifos (ug/L) - TW	2023/08/14	<MDL 0.02	90.00	No	No
Diazinon (ug/L) - TW	2023/08/14	<MDL 0.02	20.00	No	No
Dicamba (ug/L) - TW	2023/08/14	<MDL 0.2	120.00	No	No
1,2-Dichlorobenzene (ug/L) - TW	2023/08/14	<MDL 0.41	200.00	No	No
1,4-Dichlorobenzene (ug/L) - TW	2023/08/14	<MDL 0.36	5.00	No	No
1,2-Dichloroethane (ug/L) - TW	2023/08/14	<MDL 0.35	5.00	No	No
1,1-Dichloroethylene (ug/L) - TW	2023/08/14	<MDL 0.33	14.00	No	No
Dichloromethane (Methylene Chloride) (ug/L) - TW	2023/08/14	<MDL 0.35	50.00	No	No
2,4-Dichlorophenol (ug/L) - TW	2023/08/14	<MDL 0.15	900.00	No	No
2,4-Dichlorophenoxy acetic acid (2,4-D) (ug/L) - TW	2023/08/14	<MDL 0.19	100.00	No	No
Diclofop-methyl (ug/L) - TW	2023/08/14	<MDL 0.4	9.00	No	No
Dimethoate (ug/L) - TW	2023/08/14	<MDL 0.06	20.00	No	No
Diquat (ug/L) - TW	2023/08/14	<MDL 1.0	70.00	No	No
Diuron (ug/L) - TW	2023/08/14	<MDL 0.03	150.00	No	No
Glyphosate (ug/L) - TW	2023/08/14	<MDL 1.0	280.00	No	No
Malathion (ug/L) - TW	2023/08/14	<MDL 0.02	190.00	No	No
Metolachlor (ug/L) - TW	2023/08/14	0.01	50.00	No	No
Metribuzin (ug/L) - TW	2023/08/14	<MDL 0.02	80.00	No	No
Monochlorobenzene (Chlorobenzene) (ug/L) - TW	2023/08/14	<MDL 0.3	80.00	No	No
Paraquat (ug/L) - TW	2023/08/14	<MDL 1.0	10.00	No	No
PCB (ug/L) - TW	2023/08/14	<MDL 0.04	3.00	No	No

	Sample Date (yyyy/mm/dd)	Sample Result	MAC	Number of Exceedances	
				MAC	1/2 MAC
Pentachlorophenol (ug/L) - TW	2023/08/14	<MDL 0.15	60.00	No	No
Phorate (ug/L) - TW	2023/08/14	<MDL 0.01	2.00	No	No
Picloram (ug/L) - TW	2023/08/14	<MDL 1.0	190.00	No	No
Prometryne (ug/L) - TW	2023/08/14	<MDL 0.03	1.00	No	No
Simazine (ug/L) - TW	2023/08/14	<MDL 0.01	10.00	No	No
Terbufos (ug/L) - TW	2023/08/14	<MDL 0.01	1.00	No	No
Tetrachloroethylene (ug/L) - TW	2023/08/14	<MDL 0.35	10.00	No	No
2,3,4,6-Tetrachlorophenol (ug/L) - TW	2023/08/14	<MDL 0.2	100.00	No	No
Triallate (ug/L) - TW	2023/08/14	<MDL 0.01	230.00	No	No
Trichloroethylene (ug/L) - TW	2023/08/14	<MDL 0.44	5.00	No	No
2,4,6-Trichlorophenol (ug/L) - TW	2023/08/14	<MDL 0.25	5.00	No	No
2-Methyl-4chlorophenoxyacetic Acid (MCPA) (ug/L)	2023/08/14	<MDL 0.12	100	No	No
Trifluralin (ug/L) - TW	2023/08/14	<MDL 0.02	45.00	No	No
Vinyl Chloride (ug/L) - TW	2023/08/14	<MDL 0.17	1.00	No	No
Distribution Water					
Trihalomethane: Total (ug/L) Annual Average - DW	2023 Annual Average	64.8	100	No	Yes
HAA Total (ug/L) Annual Average - DW	2023 Annual Average	54.5	80	No	Yes

MAC = Maximum Allowable Concentration as per O. Reg. 169/03
 MDL = Method Detection Limit

Additional Legislated Samples

Municipal Drinking Water Licence (MDWL)	Collected Weekly June – Oct 2022	Total Microcystin Raw Results Range (ug/L)	Total Microcystin Treated Water Results Range (ug/L)	Treated Water Total Microcystin Limit 1.5 ug/L Exceeded Y/N
Harmful Algal Blooms Monitoring required June to October at a minimum. Samples collected weekly. Raw water tested for Total Microcystins.	June	<0.1 – <0.1	-	N
	July	<0.1 - <0.1	-	N
	August	<0.1 - <0.1	-	N
	September	<0.1 - <0.1	-	N
	October	<0.1 – <0.1	-	N

Method Detection Limit is 0.1ug/L

* Treated water is only sampled if microcystins are detected in the raw water sample.

Inorganic or Organic Parameter Exceedances

List any 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
Trihalomethane: Total (ug/L) Annual Average	64.8	ug/L	2023 Annual Average
HAA Total (ug/L) Annual Average	54.5	ug/L	2023 Annual Average

Major Maintenance Summary incurred to install, repair or replace required equipment.

Item #	Description
1	Remove and re-install new liner in Brechin Water Tower
2	Replace 4" backflow preventer
3	Replace highlift #5 actuator
4	Water main break on Harrigan Drive
5	New water main connected in industrial park
6	Repair multiple main valve boxes and curb stops
7	Installed new PLC
8	Filter lockout programming
9	Replaced reservoir level sensor
10	Replaced post chlorine pump degassing solenoids

Appendix A

WTRS Data Submission Confirmation

Ontario   **Ministry of the Environment,
Conservation and Parks**

| [WT DATA](#) | [USER PROFILE](#) | [CONTACT US](#) | [HELP](#) | [HOME](#) | [LOGOUT](#) |

Location: [WTRS](#) / [WT DATA](#) / [Input WT Record](#) WTRS-WT-008

Water Taking Data submitted successfully.

Confirmation:


Thank you for submitting your water taking data online.

Permit Number: 0278-AQ4LYS
Permit Holder: THE CORPORATION OF THE TOWNSHIP OF RAMARA.
Received on: Feb 14, 2024 2:05 PM

This confirmation indicates that your data has been received by the Ministry, but should not be construed as acceptance of this data if it differs from that specified on the Permit Number, assigned to the Permit Holder stated above.

[Print Confirmation](#) [Return to Main Page](#)

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version: v4.5.0.21 (build#: 22)
Last modified: 2018/09/18

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