February 28, 2024

MUNICIPALITY OF LAKESHORE
LAKESHORE WATER TREATMENT PLANT AND WATER SERVICE AREA
2023 ANNUAL & SUMMARY REPORT
MADE UNDER O.REG. 170/03

The Municipality of Lakeshore is required to provide an *Annual Report* for each of its Ministry of the Environment Conservation and Parks (MECP) drinking water systems under Drinking Water Systems Regulation *O.Reg. 170/03* in accordance with the *Safe Drinking Water Act* (as amended). This *Annual Report* is due to be posted for public viewing by the end of February of the following year.

Under *Schedule 22 of Ontario Regulation 170/03*, a regulation made under the *Safe Drinking Water Act 2002*, requires that a large municipal residential drinking-water system must provide to its members of municipal council a Summary Report on various aspects of the system before March 31 of the following year. The Lakeshore Water Service Area is classed as a large municipal residential drinking-water system and is therefore subject to Schedule 22. The purpose of this letter and its attachments is to satisfy this requirement and report on dates from January 1, 2023 until December 31, 2023.

The Municipality of Lakeshore owns and operates four (4) separate drinking water systems under MECP jurisdiction. This letter focusses on the *Lakeshore Water Treatment Plant (WTP) and Water Service Area (WSA)* which is registered as having *Drinking Water System #260091507* under *Municipal Drinking Water License #031-101.* This drinking water system is deemed to be *Large Municipal Residential* having a mathematically assumed population of 31,051 having 11,890 service connections at the end of 2023.

The *John George* WTP, located in Belle River, utilizes a long multibarrier approach to water treatment. This facility has the following process flow: Seasonally chlorinated and screened intake for zebra mussel control, four (4) raw water clarifiers performing coagulation and flocculation with a seasonal taste and odour control option, conventional filtration using Granular Activated Carbon and Sand, Primary Disinfection via UV disinfection, Gaseous Chlorine injection for disinfection both Primary and Secondary. The chemicals utilized at the Belle River WTP are as follows: Poly Aluminum Chloride (DELPAC & STERNPAC Products), Polyelectrolytes, Powdered and Granular Activated Carbon, Chlorine Gas. The WTP does not include Fluoridation in its processes.

The treatment process includes various continuous monitoring equipment for turbidity, chlorine, temperature, pH, UV dose and flows. The WTP's high lift pumps feed the treated water from the *John George* facility to the Belle River Water Tower. The Belle River Water Tower has a maximum operating capacity of 5800 cubic metres and supplies 282 km's of water main under normal operation.

The *John George* WTP is an automated facility that is controlled via a Supervisory Control and Data Acquisition (SCADA) system that has been in place and upgraded since the John George WTP was commissioned in 2009. *O.Reg.170/03* also specifies the data that must be downloaded, stored and at what interval by utilizing the online continuous monitors that allow the plant to be automated and comply with all associated regulations. The results of these online instruments as required in this report are listed below in Table I.

TABLE I
2023 OPERATIONAL TESTING
REGULATION 170/03 DURING 2022

	Number of Grab Samples	Range of Results (min #)-(max #)	Unit of Measure
Turbidity Filter AVG	**8760**	**0.0 – 0.07**	**NTU**
Chlorine	**8760**	**0.77 – 2.28**	**Free CL mg/l**
Distribution Additional Residuals	**829**	**0.22 – 1.72**	**Free CL mg/l**

NTU – Nephelometric Turbidity Units
8760 – Indicates continuous monitoring equipment used
CL – Chlorine
mg/l – milligram per litre

Under *Schedule 10* of *O.Reg.170/03* the Municipality of Lakeshore is required to complete microbiological testing of its raw intake water, treated water and distribution water. Treated water is sampled immediately prior to the high lift pumps, any sample taken after the high lift pumps is considered distribution. All of these samples are required to be tested by a certified laboratory accredited for drinking water samples. Table II outlines these analytical results.

TABLE II
2023 MICROBIOLOGICAL TESTING DONE UNDER
SCHEDULE 10 OF REGULATION 170/03

	NUMBER OF SAMPLES	RANGE OF E.COLI OR FECAL RESULTS (MIN #)-(MAX #) cfu's	RANGE OF TOTAL COLIFORM RESULTS (MIN #)-(MAX #) cfu's	NUMBER OF HPC SAMPLES	RANGE OF HPC RESULTS (MIN #)-(MAX #) cfu's
Raw	**52**	**0 – 50**	**0 – 1250**	**0**	**NA**
Treated	**104**	**0 – 0**	**0 – 20**	**104**	**<10 – 10**
Distribution	**576**	**0 – 27**	**0 – 90**	**314**	**<10 - 90**

cfu – colony forming units
HPC – heterotrophic plate count

The Municipality of Lakeshore is also required to take treated and distribution samples for various organic and inorganic parameters under *O.Reg. 170/03 Schedule 23 & 24.* Table III and Table IV show the treated water sample results from this regulatory sampling

requirement. No organic or inorganic sample exceeded any regulatory requirement as samples for 2023.

TABLE III
2023 INORGANIC PARAMETERS TESTED
TREATED WATER
REGULTATION 170/03

Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Antimony	October 17th, 2023	<0.0001	mg/l	NO
Arsenic	October 17th, 2023	0.0002	mg/l	NO
Barium	October 17th, 2023	0.014	mg/l	NO
Boron	October 17th, 2023	0.009	mg/l	NO
Cadmium	October 17th, 2023	<0.000010	mg/l	NO
Chromium	October 17th, 2023	<0.002	mg/l	NO
Sodium	October 17th, 2023	9.0	mg/l	NO
Mercury	October 17th, 2023	<0.00002	mg/l	NO
Selenium	October 17th, 2023	<0.001	mg/l	NO
Uranium	October 17th, 2023	<0.00005	mg/l	NO
Fluoride	October 17th, 2023	<0.1	mg/l	NO
Nitrite	October 17th, 2023	<0.1	mg/l	NO
Nitrate	October 17th, 2023	0.21	mg/l	NO

mg/l – milligram per litre

TABLE IV
2023 ORGANIC PARAMETERS
ANNUAL TREATED WATER REQUIRMENT
REGULTATION 170/03

Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Alachlor	October 17th, 2023	<0.3	ug/l	NO
Atrazine	October 17th, 2023	<0.5	ug/l	NO
Atrazine (Desethyl)	October 17th, 2023	<0.5	ug/l	NO
Atrazine + N-dealkylated metobolites	October 17th, 2023	<0.5	ug/l	NO
Azinphos-methyl	October 17th, 2023	<1.0	ug/l	NO
Benzene	October 17th, 2023	<0.5	ug/l	NO
Benzo(a)pyrene	October 17th, 2023	<0.006	ug/l	NO
Bromoxynil	October 17th, 2023	<0.5	ug/l	NO
Carbaryl	October 17th, 2023	<3.0	ug/l	NO
Carbofuran	October 17th, 2023	<1.0	ug/l	NO
Carbon Tetrachloride	October 17th, 2023	<0.2	ug/l	NO
Chlorobenzene	October 17th, 2023	<0.5	ug/l	NO
Chlorpyrifos	October 17th, 2023	<0.5	ug/l	NO
Diazinon	October 17th, 2023	<1.0	ug/l	NO
1,2-Dichlorobenzene	October 17th, 2023	<0.5	ug/l	NO
1,4-Dichlorobenzene	October 17th, 2023	<0.5	ug/l	NO
1,2-Dichloroethane	October 17th, 2023	<0.5	ug/l	NO
1,1-Dichloroethylene (Methylene chloride)	October 17th, 2023	<0.5	ug/l	NO
2-4 Dichlorophenol	October 17th, 2023	<0.2	ug/l	NO
Diclofop-methyl	October 17th, 2023	<0.9	ug/l	NO
Dimethoate	October 17th, 2023	<1.0	ug/l	NO
Diquat	October 17th, 2023	<5.0	ug/l	NO
Diuron	October 17th, 2023	<5.0	ug/l	NO
Glyphosate	October 17th, 2023	<25	ug/l	NO
Malathion	October 17th, 2023	<5.0	ug/l	NO
Metolachlor	October 17th, 2023	<3.0	ug/l	NO
Metribuzin	October 17th, 2023	<3.0	ug/l	NO
Paraquat	October 17th, 2023	<1.0	ug/l	NO
Pentachlorophenol	October 17th, 2023	<0.2	ug/l	NO
Phorate	October 17th, 2023	<0.3	ug/l	NO
Polychlorinated Biphenyls(PCB)	October 17th, 2023	<0.05	ug/l	NO
Prometryne	October 17th, 2023	<0.1	ug/l	NO
Simazine	October 17th, 2023	<0.5	ug/l	NO
Terbufos	October 17th, 2023	<0.5	ug/l	NO
Tetrachloroethylene	October 17th, 2023	<0.5	ug/l	NO
2,3,4,6-Tetrachlorophenol	October 17th, 2023	<0.2	ug/l	NO
Triallate	October 17th, 2023	<10.0	ug/l	NO
Trichloroethylene	October 17th, 2023	<0.5	ug/l	NO
2,4,6-Trichlorophenol	October 17th, 2023	<0.2	ug/l	NO
Trifluralin	October 17th, 2023	<0.5	ug/l	NO
Vinyl Chloride	October 17th, 2023	<0.2	ug/l	NO
MCPA	October 17th, 2023	<10	ug/l	NO
2,4-(2,4-D) Dichlorophenoxy acetic acid,	October 17th, 2023	<1.0	ug/l	NO
Dicamba	October 17th, 2023	<1.0	ug/l	NO
Picloram	October 17th, 2023	<5.0	ug/l	NO

ug/l – microgram per litre

Treated and Distribution water samples are taken for selected organic and inorganic parameters. Trihalomethanes, Haloacetic Acids and Nitrite and Nitrate are sampled quarterly. Lead and alkalinity samples are taken in the distribution system bi-annually. The requirement to take and the amount of samples taken for these parameters falls under O.Reg. 170/03 and is based on population served. Tables V, VI and VII show the results satisfying the regulation.

TABLE V
2023 NITRATE AND NITRITE RESULTS
QUARTERLY TREATED WATER REQUIRMENT
REGULTATION 170/03

Parameter	Date	Result	Unit	Exceedance
Nitrate	February 28, 2023	2.28	mg/L	NO
	May 30, 2023	1.27	mg/L	NO
	August 15, 2023	1.70	mg/L	NO
	November 21, 2023	0.57	mg/L	NO
Nitrite	February 28, 2023	<0.05	mg/L	NO
	May 30, 2023	<0.05	mg/L	NO
	August 15, 2023	<0.05	mg/L	NO
	November 21, 2023	<0.05	mg/L	NO
THM's	February 28, 2023	12	ug/L	NO
	May 30, 2023	24	ug/L	NO
	August 15, 2023	33	ug/L	NO
	November 21, 2023	13	ug/L	NO
	RAA	20.5	ug/L	NO

ug/l – microgram per litre
RAA – Running Annual Average

TABLE VI
2023 TRIHALOMETHANES & HALOACETIC ACIDS RESULTS
QUARTERLY DISTRIBUTION WATER REQUIRMENT
REGULTATION 170/03

Parameter	Sample Schedule	Result	Unit of Measure	Exceedance
THM (Treated Water RAA)	Quarterly	20.5	mg/l	NO
THM (Distribution RAA)	Quarterly	30.5	mg/l	NO
HAA (Distribution RAA)	Quarterly	8.85	mg/l	NO

mg/l – milligram per litre

TABLE VII
2023 LEAD & ALKALINITY RESULTS
DISTRIBUTION WATER
REGULTATION 170/03

Location Type	Number of Samples	Range of Lead Results (min#) – (max #)	Unit of Measure	Number of Exceedances
Distribution (Lead)	14	0.00014 – 0.00103	mg/l	NONE
Distribution (Alkalinity)	14	85 - 102	mg/l	NA

mg/l – milligram per litre

TABLE VIII
2023 RESIDUAL MANAGEMENT
TOTAL SUSPENDED SOLIDS
REQUIRED UNDER MUNICIPAL DRINKING WATER LICENCE

Date of legal instrument issued	Parameter	Date Sampled	Result	Unit of Measure
May 21, 2021 MDWL 031-101 #4	Total Suspended Solids	RAA	8.1	mg/l

RAA – Running Annual Average (monthly sample averaged)

The water treatment system and service area require extensive maintenance annually. These costs are required to install new equipment and maintain the current assets. A brief description of large priced capital items is listed as part of this letter. Below is Table IX which lists the large expenditures for 2023 within the Lakeshore Water Treatment Plant and Water Service Area.

TABLE IX
2022 PROJECT COSTS

Project	Cost Incurred
Meter Replacement Program	$566,536
PLC (Programable Logic Controller) replacements	$104,914
Belle River WTP Lifecycle Assessment	$25,440
Belle River High Lift Pump Design	$4,477
CO2 Metering System	$6,389
Strong Road Watermain Improvements	$6,099
West Puce Road Watermain Improvements	$54,301
Railway Avenue Watermain Improvements	$16,857

Under *O.Reg.170/03* the Municipality is required to report notices submitted in accordance with the *Safe Drinking Water* Act. There were two notices filed and reported to the *Spills Action Centre* and their details can be seen below in Table X.

TABLE X
Detail of ADWQI Notice's filed 2023

Incident Date	Parameter	Result	Unit of Measure	Corrective Action	Corrective Action Date
July 5th, 2023	Microbiological	1 Total Coliform / Distribution	CFU	Flush and Resample	July 6th, 2023
July 11th, 2023	Microbiological	27 Total Coliform / Distribution	CFU	Flush and Resample	July 12th, 2023
August 18th, 2023	Chemical / Microbiological	0.20 ug/L Total Microcystin / Treated	ug/L	Resample x 4	August 25th, 2023

As shown above there were three occasions when the Lakeshore Water Service Area was not in compliance with the 1 requirement of the Safe Drinking Water Act 2002, associated regulations, system approvals, Drinking Water Works Permit, Municipal Drinking Water Licence and provincial officer orders. In Table XI below the specific legislation requirements and corrective measures are stated.

Table XI
Legislative Requirements & Corrective Actions
ADWQI Notice's Filed

Drinking Water Legislation	Requirement(s) the System Failed to Meet	Specify the Duration of the Failure (i.e. date(s))	Describe the Measures Taken to Correct the Failure	Status (complete or outstanding)
Safe Drinking Water Act	Associated Regulations	See Below	See Below	[redacted]
Ontario Regulations	O.Reg. 169/03	July 5th, July 11th, August 18th	Flush and Resample	Complete
System Approvals	none	[redacted]		
System Drinking Water Works Permit and Municipal Drinking Water Licence	none			
Provincial Officer's Order	None			

A summary of the quantities and flow rates of water supplied during the period covered by the report, including monthly average flows, maximum daily flows and daily maximum flow rates taken per minute is required reporting in the Summary Report.

The Lakeshore Water Service Area operated under the following listed Permits to Take Water and did not exceed its limits in 2023.

(PTTW) Number 3648-B3EQWX issued on August 16, 2018 has the following flow conditions:

- Maximum Allowable Amount Taken per Minute (Litres/Min) **34,722**
- Maximum Allowable Amount Taken Per Day (Litres/Day) **30,000,000**

The maximum amounts of raw water taken during 2023 are as follows:

- Maximum Amount Taken per Minute in 2023 (Litres/Min) **17,034 (October 3, 2023)**
- Maximum Amount Taken Per Day in 2023 (Litres/Day) **18,439,840 (June 4, 2023)**

The Lakeshore Water Service Area operated under Drinking Water Works Permit #031-201 and Municipal Drinking Water Licence (MDWL) #031-101 during 2023:

The MDWL has the following flow conditions:

- The maximum daily volume of treated water that flows from the treatment subsystem to the distribution subsystem shall not exceed **36,400 m^3/day**.

- The maximum daily volume of water pumped into the distribution system in 2023 was **18,206 m3/day**

The following Table XII & XIII give the monthly average and maximum flows for the Lakeshore Water Service Area.

Table XII
2023 Raw Water Flow Data
Lake Water Used

Month	Maximum Allowed Flow Rate (m^3/Day)	Average Flow (m^3/Day)	Maximum Flow (m^3/Day)	Maximum Allowed Flow Rate (Litres/ Minute)	Maximum Flow Rate (Litres/ Minute)
January	30,000	7,870	8,357	34,722	15,246
February	30,000	8,456	15,777	34,722	14.940
March	30,000	7,903	8,342	34,722	14,340
April	30,000	8,477	9,250	34,722	14,412
May	30,000	11,377	17,352	34,722	16,032
June	30,000	13,817	18,439	34,722	16,782
July	30,000	11,337	13,840	34,722	16,530
August	30,000	10,888	13,770	34,722	16,956
September	30,000	11,020	13,399	34,722	16,884
October	30,000	8,817	11,152	34,722	17,034
November	30,000	7,929	8,513	34,722	8,502
December	30,000	8,047	9,485	34,722	8,826

Table XIII
2023 Treated Water Flow Data
Water Sent to Distribution System

Month	Maximum Allowed Flow Rate (m^3/Day)	Average Daily Flow (m^3/Day)	Maximum Daily Flow (m^3/Day)	Maximum Flow Rate (Litres/ Minute)
January	36,400	7,848	8,485	11,790
February	36,400	8,410	13,050	12,195
March	36,400	7,946	8,629	11,756
April	36,400	8,483	9,530	11,767
May	36,400	11,275	16,079	12,442
June	36,400	13,613	18,206	36,000
July	36,400	11,171	13,737	15,930
August	36,400	10,766	13,119	17,685
September	36,400	10,773	13,287	17,685
October	36,400	8,745	10,737	11,970
November	36,400	7,980	8,678	23,220
December	36,400	8,075	11,063	11,801

- Flow Metre Calibration, not actual effluent max flow

This report is made available to the public for viewing on the Municipality's website at https://www.lakeshore.ca/en/municipal-services/plans-publications-and-reports.aspx#Drinking-Water-Annual-Reports. The report is printed and available for viewing at 419 Notre Dame Street (Town Hall) & 492 Lakeview Dr., Belle River, Ontario. Both versions are available after February 29th, 2024.