

The Regional Municipality of Durham

Sunderland Drinking Water System 2023 Annual Report

Drinking Water System Number: 220004910

Municipal Drinking Water Licence Number: 003-110

Drinking Water System Owner: The Regional Municipality of Durham

Drinking Water System Category: Large Municipal Residential

This Annual Report for the calendar year 2023 is designed to inform you about your drinking water system. This report has been prepared to satisfy Section 11 of Ontario Regulation (O. Reg.) 170/03. O. Reg. 170/03 sets requirements for drinking water systems with regard to sampling and testing, levels of treatment, certification of staff, and notification of authorities and the public about water quality. Hard copies of this report and the Schedule 22 Summary Report are available at the Regional Municipality of Durham Headquarters office that is located at 605 Rossland Road East, Whitby. The annual report is also available on the [Region of Durham's website](http://www.durham.ca) at www.durham.ca. Further information regarding the Drinking Water Regulations can be found on the [Ministry of the Environment, Conservation and Parks website](http://www.ontario.ca/ministry-environment-conservation-parks) at www.ontario.ca/ministry-environment-conservation-parks.

Drinking Water System Process Description

General

The Sunderland Drinking Water System supplies potable water to consumers in the Community of Sunderland in the Township of Brock. Sunderland has three municipal wells designated as Well No. 1, Well No. 2 and Well No. 3. Wells No. 1 and No. 2 in Sunderland are classified as groundwater under direct influence of surface water (GUDI) with effective in-situ filtration. All three municipal wells are equipped with an ultraviolet (UV) system to provide disinfection. Sunderland is a Class One Water Treatment System which feeds a Class One Distribution Subsystem and Class One Trunk Distribution Subsystem. The approved capacity of Well No. 1 is 1,374 cubic metres per day (m³/d) and the approved capacity for Well No. 3 is 864 m³/d. Well No. 2 was taken offline due to low ultraviolet transmittance. The Sunderland treatment and distribution systems are owned and operated by the Regional Municipality of Durham. The water supply system includes the following processes:

- Raw water supply,
- Disinfection (sodium hypochlorite),
- Ultraviolet disinfection (UV),
- Cartridge filtration (Well No. 3), and
- Distribution.

Raw Water Supply

Water is pumped from three wells, Well No. 1, Well No. 2 (offline in 2023) and Well No. 3 which are drilled to a depth of 8.9 metres (m), 11.2 m. and 33.5 m respectively. Water is delivered to the system by the well pumps.

Disinfection

Disinfection equipment for both Well No. 1 and Well No. 2 is located in a centralized pumphouse. For primary disinfection the water is treated with an UV disinfection system. For secondary disinfection the water is then chlorinated with sodium hypochlorite. Well No. 3 pumps to a dedicated treatment system that contains two parallel trains of cartridge filters and two UV reactors. The water is chlorinated with sodium hypochlorite. The free chlorine residual and turbidity are monitored continuously by online analyzers. The UV and chlorination systems will shut down the well pumps if an alarm occurs.

Distribution System

The distribution system delivers the treated water through approximately 11 kilometres of watermains and includes a 1,773 cubic metre standpipe for storage and pressure equalization.

Major Monetary expenses (above \$10,000)

Under Section 11 of O. Reg. 170/03, a description of any major expenses incurred during this reporting period to install, repair or replace required equipment must be included in the annual report. The details of major expenses for this drinking water system are as follows:

Well 1 and 2 UV replacement - \$704,246

Well 2 rehabilitation - \$39,388

Tables

For a description of terms and abbreviations in all tables, refer to the glossary at the end of the report.

Sunderland Drinking Water System (DWS) Table 1

Summary of all Adverse Water Quality Incidents in 2023 Reported to Spills Action Centre in Accordance with Schedule 16-3 and 16-4 of O. Reg. 170/03.

Incident Date	Parameter	Result	Corrective Action	Corrective Action Date
March 9	Sodium (Plant)	20.1 Milligrams per Litre (mg/L)	Resampled	March 9
April 4	Lead (Distribution)	0.692 mg/L	Hydrant was isolated and placed out of service on April 4. On April 5, hydrant components were replaced, then the hydrant was flushed and resampled. Results met Ontario Drinking Water Quality Standards (ODWQS).	April 5

Sunderland DWS Table 2

Microbiological Membrane Filtration (MF) Testing Under Schedule 10 of O. Reg. 170/03.

Type of Sample	Number of Samples	Range of <i>Escherichia coli</i> MF Colony Forming Units per 100 Millilitres	Range of Total Coliforms MF Colony Forming Units per 100 Millilitres
Raw	151	Non-Detect (ND) – Overgrown (OG)	ND – OG
Treated	1	ND	ND
Distribution	7	ND	ND

Sunderland DWS Table 3

Microbiological Presence Absence (P/A) Testing Under Schedule 10 of O. Reg. 170/03.

Type of Sample	Number of Samples	<i>Escherichia coli</i> P/A per 100 Millilitres	Total Coliforms P/A per 100 Millilitres
Treated	100	Absence (A)	A
Distribution	155	A	A

Sunderland DWS Table 4

Microbiological Heterotrophic Plate Count (HPC) Testing Under Schedule 10 of O. Reg. 170/03.

Type of Sample	Number of Samples	Range of HPC Samples Colony Forming Units per Millilitre
Treated	101	Non-Detect (ND) - 31
Distribution	85	ND - 670

Sunderland DWS Table 5

Operational Testing Under Schedule 7 of O. Reg. 170/03.

Test	Number of Samples	Range of Results	Unit of Measure	Parameter Description
Turbidity - Raw Water	123	0.06 – 0.74	Nephelometric Turbidity Units (NTU)	Turbidity is a measure of particles in water.
Free Chlorine - Plant	Continuous	0.56 – 2.06*	Milligram per Litre (mg/L)	Must be sufficient to ensure disinfection has been achieved.
Free Chlorine - Distribution	Continuous	0.14 – 2.20*	mg/L	Recommended level of at least 0.20 mg/L in the distribution system to maintain secondary disinfection, 0.05 mg/L is the minimum required.

*Results include all analyzers and grab samples.

Sunderland DWS Table 6

Summary of Treated Water Inorganic Parameter Testing Under Schedules 13 and 23 of O. Reg. 170/03.

Parameter	Number of Samples	Results Range	MAC	Unit of Measure	MAC Exceedance	Potential Sources*
Antimony	12	Non-Detect (ND)	0.006	Milligram per Litre (mg/L)	No	Fire retardants, ceramics, electronics, solder.
Arsenic	12	ND	0.01	mg/L	No	Mining.
Barium	4	0.04 – 0.0653	1.0	mg/L	No	Metal refineries, oil drilling.
Boron	4	0.0084 – 0.0128	5.0	mg/L	No	Industrial.
Cadmium	12	ND	0.005	mg/L	No	Industrial.
Chromium	12	ND	0.05	mg/L	No	Industrial.
Total Haloacetic acids - Distribution (annual average)	4	0	80	Microgram per Litre (ug/L)	No	By-product of chlorination of drinking water.
Mercury	4	ND	0.001	mg/L	No	Industrial.
Selenium	12	ND	0.05	mg/L	No	Refineries, mines, chemical manufacturing.
Sodium	8	6.93 – 20.1	Not Applicable**	mg/L	Yes (1)***	Storm water runoff including road salt.
Total Trihalomethanes - Distribution (annual average)	4	13.4	100	ug/L	No	By-product of chlorination of drinking water.
Uranium	4	0.0008 – 0.0015	0.02	mg/L	No	Power generation.
Fluoride	8	ND	1.5	mg/L	No	Mining.
Nitrite	8	ND	1.0	mg/L	No	Agriculture runoff, landfill leachate and animal waste.
Nitrate	8	1.22 – 4.01	10.0	mg/L	No	Fertilizer.

* Parameters may occur naturally in the environment.

** Sodium does not have a Maximum Acceptable Concentration (MAC); only an aesthetic objective of 200 mg/L. Sodium results exceeding 20 mg/L are to be reported to the Medical Officer of Health as per Schedule 16-3 (8) of O. Reg. 170/03.

*** Number in parenthesis represents number of exceedance(s) above 20 mg/L. For Sodium, regulations require reporting when results exceed 20 mg/L if it has not been reported in the preceding 57 months.

Sunderland DWS Table 7

Summary of Lead Testing Under Schedule 15.1 of O. Reg. 170/03.

Location Type	Number of Samples	Range of Lead Results Milligram per Litre	MAC	Number of Exceedances	pH	Alkalinity Milligram per Litre
Plumbing	Not Required (N/R)	N/R	0.01	N/R	N/R	N/R
Distribution	5	Non-Detect (ND) – 0.692	0.01	1	7.2 – 7.4	259 – 295

Sunderland DWS Table 8

Summary of Treated Water Organic Parameter Testing Under Schedule 24 of O. Reg. 170/03.

Parameter	Number of Samples	Results Range	MAC	Unit of Measure	MAC Exceedance	Potential Sources
Alachlor	4	Non-Detect (ND)	5	Microgram per Litre (ug/L)	No	Agricultural herbicide.
Atrazine + N-dealkylated metabolites	4	ND	5	ug/L	No	Agricultural herbicide.
Azinphos-methyl	4	ND	20	ug/L	No	Insecticide.
Benzene	4	ND	1	ug/L	No	Plastics manufacturing, leaking fuel tanks.
Benzo(a)pyrene	4	ND	0.01	ug/L	No	Formed from the incomplete burning of organic matter.
Bromoxynil	4	ND	5	ug/L	No	Agricultural herbicide.
Carbaryl	3	ND	90	ug/L	No	Agricultural, forestry, household insecticide.

Sunderland DWS Table 8 continued

Parameter	Number of Samples	Results Range	MAC	Unit of Measure	MAC Exceedance	Potential Sources
Carbofuran	3	Non-Detect (ND)	90	Microgram per Litre (ug/L)	No	Agricultural insecticide.
Carbon Tetrachloride	4	ND	2	ug/L	No	Chemical and industrial activities.
Chlorpyrifos	4	ND	90	ug/L	No	Agricultural, household insecticide.
Diazinon	4	ND	20	ug/L	No	Agricultural, livestock, operation, residential insecticide.
Dicamba	4	ND	120	ug/L	No	Agricultural herbicide
1,2-Dichlorobenzene	4	ND	200	ug/L	No	Chemical and industrial factories.
1,4-Dichlorobenzene	4	ND	5	ug/L	No	Chemical and industrial factories.
1,2-Dichloroethane	4	ND	5	ug/L	No	Industrial chemical factories.
1,1-Dichloroethylene (vinylidene chloride)	4	ND	14	ug/L	No	Industrial chemical factories.
Dichloromethane	4	ND	50	ug/L	No	Pharmaceutical and chemical factories.
2,4-Dichlorophenol	4	ND	900	ug/L	No	Industrial contamination, reaction with chlorine.
2,4-Dichlorophenoxy acetic acid (2,4-D)	4	ND	100	ug/L	No	Agricultural, residential herbicide.

Sunderland DWS Table 8 continued

Parameter	Number of Samples	Results Range	MAC	Unit of Measure	MAC Exceedance	Potential Sources
Diclofop-methyl	4	Non-Detect (ND)	9	Microgram per Litre (ug/L)	No	Agricultural herbicide.
Dimethoate	4	ND	20	ug/L	No	Agricultural, livestock, operation, residential insecticide.
Diquat	4	ND	70	ug/L	No	Agricultural, aquatic herbicide.
Diuron	3	ND	150	ug/L	No	Agricultural, industrial herbicide.
Glyphosate	4	ND	280	ug/L	No	Agricultural, forestry, household herbicide.
Malathion	4	ND	190	ug/L	No	Pest control insecticide.
2-Methyl-4-chlorophenoxyacetic acid (MCPA)	4	ND	100	ug/L	No	Agricultural herbicide.
Metolachlor	4	ND	50	ug/L	No	Agricultural herbicide.
Metribuzin	4	ND	80	ug/L	No	Agricultural herbicide.
Monochlorobenzene	4	ND	80	ug/L	No	Industrial and agricultural chemical factories and dry cleaning facilities.
Paraquat	4	ND	10	ug/L	No	Agricultural, aquatic herbicide.
Pentachlorophenol	4	ND	60	ug/L	No	Pesticide, wood preservative residue.
Phorate	4	ND	2	ug/L	No	Agricultural insecticide.

Sunderland DWS Table 8 continued

Parameter	Number of Samples	Results Range	MAC	Unit of Measure	MAC Exceedance	Potential Sources
Picloram	4	Non-Detect (ND)	190	Microgram per Litre (ug/L)	No	Industrial herbicide.
Polychlorinated Biphenyls(PCB)	4	ND	3	ug/L	No	Residue from various industrial uses.
Prometryn	4	ND	1	ug/L	No	Agricultural herbicide.
Simazine	4	ND	10	ug/L	No	Agricultural herbicide.
Terbufos	4	ND	1	ug/L	No	Agricultural insecticide.
Tetrachloroethylene (perchloroethylene)	4	ND	10	ug/L	No	Leaching from PVC pipes; discharge from factories; dry cleaners and auto shops (metal degreaser).
2,3,4,6 - Tetrachlorophenol	4	ND	100	ug/L	No	Wood preservative.
Triallate	3	ND	230	ug/L	No	Agricultural herbicide.
Trichloroethylene	4	ND	5	ug/L	No	Metal degreasing sites and other factories.
2,4,6-Trichlorophenol	4	ND	5	ug/L	No	Pesticide manufacturing.
Trifluralin	4	ND	45	ug/L	No	Agricultural herbicide.
Vinyl Chloride	4	ND	1	ug/L	No	Leaching from PVC pipes; discharge from plastics factories.

Sunderland DWS Table 9

Inorganic or Organic Parameter(s) that Exceed Half the Standard Prescribed in Schedule 2 of the Ontario Drinking Water Quality Standards.

Parameter	Result	MAC	Unit of Measure	Date of Sample
Lead (Distribution)	0.692	0.010	Milligrams per Litre (mg/L)	April 4