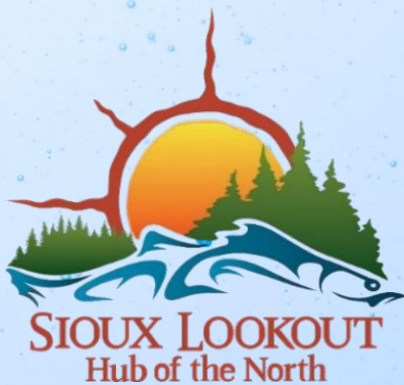


# 2019 Annual Report

Sioux Lookout Urban Drinking Water System



Prepared by Northern Waterworks Inc. on behalf of the Municipality of Sioux Lookout

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# 1 INTRODUCTION

## 1.1 Annual Reporting Requirements

This consolidated Annual Report (the Report) has been prepared in accordance with both section 11 (Annual Reports) and Schedule 22 (Summary Reports for Municipalities) of Ontario Regulation 170/03 (Drinking Water Systems Regulation). This Report is intended to inform both the public and Municipal Council on the operation of the system over the previous calendar year (January 1 to December 31, 2019).

Section 11 of O. Reg. 170/03 requires the development and adequate distribution to the public of an annual report summarizing water quality monitoring results, adverse water quality incidents, system expenses and chemicals used in the water treatment process.

Schedule 22 of O. Reg. 170/03 requires the development and distribution to Council of an annual report summarizing incidents of regulatory non-compliance and associated corrective actions, in addition to providing flow monitoring results for the purpose of enabling the Owner to assess the capability of the system to meet existing and planned demand.

## 1.2 Report Availability

In accordance with section 11 of O. Reg. 170/03 this Report must be given, without charge, to every person who requests a copy. Effective steps must also be taken to advise users of water from the system that copies of the report are available, without charge, and of how a copy may be obtained. This Annual Report shall be made available for inspection by the public at the Municipal Office in Sioux Lookout, at the Lost Lake Seniors Drop-In Centre in Hudson, on the Municipality's website and on NWI's website.

In accordance with Schedule 22 of O. Reg. 170/03 this Annual Report must be given to the members of Municipal Council. Section 19 (Standard of care, municipal drinking-water system) of Ontario's *Safe Drinking Water Act* also places certain responsibilities upon those municipal officials who oversee an accredited operating authority or exercise decision-making authority over a system. The examination of this Report is one of the methods by which municipal officials may fulfil the obligations required by section 19 of O. Reg. 170/03.

System users and members of Council are strongly encouraged to contact a representative of NWI for assistance in interpreting this Report. Questions and comments may be directed to the local NWI Operations Manager or by email to [compliance@nwi.ca](mailto:compliance@nwi.ca).

## 2 SYSTEM OVERVIEW

### 2.1 System Description

The Sioux Lookout Urban Drinking Water System (DWS No. 220001405) must meet extensive treatment and testing requirements in order to ensure that human health is protected. The operation and maintenance of the system is governed by Ontario's *Safe Drinking Water Act* and the regulations therein, in addition to requirements within system-specific approvals.

The Sioux Lookout Urban Drinking Water System is classified as a large municipal residential system and is composed of a raw water pumping station, the Sioux Lookout Water Treatment Plant (WTP) and the Sioux Lookout water distribution system. The system is owned by the Corporation of the Municipality of Sioux Lookout and is operated, maintained and managed by Northern Waterworks Inc.. Potential pathogenic organisms are removed and inactivated by chemical coagulation, flocculation, membrane ultrafiltration and disinfection using both free chlorine and ultraviolet (UV) irradiation processes.

Raw water flows by gravity from the intake structure located in Pelican Lake to an underground wet well located at the raw water pumping station. Pumps transfer water from the wet well and through a transmission line to the flocculation tanks at the WTP. At the Sioux Lookout WTP aluminum sulphate (coagulant) and sodium hydroxide (pH/alkalinity adjustment) are injected and rapidly mixed into the raw water immediately upstream from the flocculation tanks. In the tanks water is gently mixed to promote floc formation, which will in turn facilitate membrane filtration.

Flocculated water is directed to underground process reservoirs containing submerged membrane ultrafilters. Permeate (filtered water) is drawn through the membrane filters using a vacuum generated by pumps, effectively filtering impurities from the water. Permeate is then passed through one of two available UV reactors for disinfection and is injected with sodium hypochlorite (disinfectant), fluorosilicic acid (fluoridation) and sodium hydroxide (pH/alkalinity adjustment) as it is directed to the chlorine contact chamber and reservoir. The chlorine contact chamber uses a baffling system to allow chlorine to mix adequately with the water. The disinfected water is then held in the reservoir for a sufficient amount of time to achieve free chlorine primary disinfection.

Treated water is delivered from the reservoir to the water distribution system using pumps located at the Sioux Lookout WTP. The Sioux Lookout distribution system consists of approximately 34 km of water mains, 250 water main gate valves, 172 hydrants, a community standpipe for regulating pressure and providing extra storage, and a booster station serving the northeast portion of the system. Secondary disinfection requirements in the distribution system are achieved by maintaining a free chlorine residual at all locations.

## 2.2 Water Treatment Chemicals

In accordance with section 11 of O. Reg. 170/03, this Report must include a list of all water treatment chemicals used by the system during the period covered by the report (**Table 1**). All chemicals used in the treatment process are NSF/ANSI 60 certified for use in potable water, as required by system approvals.

**Table 1:** Water treatment chemicals used in 2019

Treatment Chemical	Application
aluminum sulphate	coagulant
sodium hydroxide	pH/alkalinity adjustment
fluorosilicic acid	fluoridation
sodium hypochlorite	disinfectant, filter cleaning agent
citric acid	filter cleaning agent

## 2.3 System Expenses

In accordance with section 11 of O. Reg. 170/03, this Report must describe any major expenses incurred during the reporting period to install, repair or replace required equipment. This Report also summarizes those expenses related to strengthening equipment inventories and to maintenance activities undertaken by subcontracted service providers. Major expenses incurred in 2019 are provided in **Table 2**.

**Table 2: Major expenses incurred in 2019**

Category	Description	Expense
Maintenance/Repair	Miscellaneous distribution system maintenance activities <sup>1</sup>	\$33,000
Replace	Sodium hypochlorite chemical metering pumps (2)	\$6,123
Inventory	12-inch UV outlet butterfly valve with electric actuator	\$5,971
Inventory/Replace	Liquid level sensors for chemical feed systems (4)	\$5,884
Inventory	Electromagnetic flowmeter for permeate	\$5,588
Repair	Reject wastewater submersible pump	\$5,412
Repair	Blower motor control wiring	\$5,294
Maintenance/Repair	Miscellaneous programming and automation services	\$4,433
Inventory/Replace	Chlorine (1) and pH (2) sensors	\$3,735
Repair	Turbidity inline analyzer	\$2,764
Maintenance/Replace	Backflow prevention device testing and replacement (1)	\$2,326
Maintenance/Repair	Thermal imaging of electrical systems	\$2,295
New Equipment	Labour to install remote communication system	\$1,784
Maintenance	Emergency generator service and load testing	\$1,782
Inventory	Valve positioner for reject wastewater flow valve	\$1,606
Maintenance	Flow meter calibration verifications	\$1,429

1. Miscellaneous distribution system maintenance activities included a) the installation of four (4) new water service connections (two (2) pertaining to upgrading previously serviced lots and two (2) pertaining to new connections), b) repairs to two (2) water service connections, c) the relocation of a mainline bleeder discharge (relocated to discharge to the sanitary sewer), d) three (3) watermain break emergency repairs, e) the swabbing of 485 metres of watermain and f) the completion of a watermain valve exercising program.

## 3 WATER QUALITY

### 3.1 Overview

In accordance with section 11 of O.Reg. 170/03, this Report must summarize the results of water quality tests required by regulations, approvals, and orders. The following sections use technical water quality terms, some of which the reader may not be familiar with. It is recommended that the reader refer to the *Technical Support Document for Ontario Drinking Water Standards, Objectives, and Guidelines* available at the following website:

<http://www.ontla.on.ca/library/repository/mon/14000/263450.pdf>. Within this document the reader will find information on provincial water quality standards, objectives and guidelines, rationale for monitoring, and a brief description of water quality parameters.

### 3.2 Microbiological Parameters

Microbiological tests are performed on source, treated and distribution water. 312 routine water samples were collected for microbiological analysis by an accredited laboratory in 2019, as required by Schedule 10 (Microbiological sampling and testing) of O. Reg. 170/03. These samples were collected on a weekly basis and included tests for E. coli (EC), total coliforms (TC) and heterotrophic plate counts (HPC). Results from microbiological analyses are summarized in **Table 3**.

**Table 3:** Results summary for microbiological parameters

Sample Type	# of Samples	EC Results Range <sup>1</sup> (MPN/100mL)	TC Results Range <sup>1</sup> (MPN/100mL)	# of HPC Samples	HPC Results Range (CFU/mL)
Raw Water	52	0 to 4	0 to 167	---	---
Treated Water	52	absent	absent	52	0 to 4
Distribution	208	absent	absent – present <sup>2</sup>	104	0 to 15
Distribution (nonroutine)	6	absent	absent	---	---

1. The Ontario Drinking Water Quality Standard for E. Coli and Total Coliforms in a treated or distribution sample is 'not detectable'. The presence of either parameter in a treated or distribution sample is considered an exceedance.
2. One (1) distribution sample collected on September 17 tested present for TC (Adverse Water Quality Incident No. 148142). Refer to the *Compliance* section of this report for more information.

### 3.3 Operational Parameters

In accordance with Schedule 7 (Operational checks) of O. Reg. 170/03, regulated operational parameters that must be monitored include raw water turbidity, filtrate turbidity, the treated water fluoride residual and the free chlorine residuals associated with primary and secondary disinfection. A comprehensive monitoring program is employed that extends beyond these regulated operational parameters to include additional tests conducted on source, process and treated water samples. **Table 4** summarizes water quality results for regulated and selected unregulated operational parameters. In accordance with Schedule 6 (Operational checks, sampling and testing – general) of O. Reg. 170/03, certain operational parameters are continuously monitored. No Adverse Water Quality Incidents (AWQIs) pertaining to operational parameters occurred during the reporting period.

**Table 4:** Results summary for operational parameters

Parameter (Sample Type)	Sample Method (Minimum Frequency)	Units	Minimum Result	Maximum Result	Annual Average	Adverse Result
Turbidity (Raw Water)	Grab (4x weekly)	NTU	0.27	1.36	0.66	n/a
Turbidity (Filter 1)	Continuous	NTU	0.025	0.167	0.036	>1.0
Turbidity (Filter 2)	Continuous	NTU	0.021	0.421	0.035	>1.0
Turbidity (Treated)	Grab (Daily)	NTU	0.033	0.274	0.081	n/a
pH (Treated)	Grab (Daily)	---	6.2	8.7	7.7	n/a
FR <sup>1</sup> (Treated)	Continuous	mg/L	0.15	0.96	0.74	>1.5
FCR <sup>1</sup> (Treated) <sup>2</sup>	Continuous	mg/L	0.19	3.18	2.15	n/a
FCR <sup>1</sup> (Distribution) <sup>3</sup>	Grab (Daily)	mg/L	0.27	2.20	n/a	<0.05

1. FR = fluoride residual; FCR = free chlorine residual.
2. There is no specific adverse result corresponding to the treated water free chlorine residual. However, an observation of adverse water quality occurs if the residual is low enough such that water has not been disinfected in accordance with the *Procedure for Disinfection of Drinking Water in Ontario*. The free chlorine residual required to achieve primary disinfection varies with flow rate, water pH and water temperature.
3. Grab samples are collected and tested for free chlorine residual at various locations throughout the water distribution system. The free chlorine residual varies with water age and distribution system location, and for this reason an annual average cannot be provided. The values in the table pertain to the minimum and maximum results collected across all locations in the calendar year.



### 3.4 Filtration & UV Disinfection Performance

In accordance with the system's *Municipal Drinking Water Licence*, membrane filtration facilities must meet certain performance criteria in order to claim log removal and inactivation credits for *Cryptosporidium* oocysts and *Giardia* cysts. In addition to continuously monitoring filtrate turbidity and other requirements, filtrate turbidity must be less than or equal to 0.1 NTU in at least 99% of the measurements each month. **Table 5** summarizes filtrate turbidity compliance against the <0.1 NTU/99% performance criterion. Minimum and maximum values in the table correspond to the proportion of time that filtered water turbidity was less than or equal to 0.1 NTU in a calendar month in 2019. No AWQIs pertaining to filtration performance occurred during the reporting period.

**Table 5:** Filtration performance summary

Filter	Filter 1	Filter 2
Minimum Result	99.999%	99.841%
Maximum Result	100%	100%
Adverse Result	<99%	<99%

To ensure primary disinfection, the UV reactors at the Sioux Lookout WTP must operate within their validated operating conditions to achieve a minimum continuous pass-through UV dose of 20 mJ/cm<sup>2</sup> (based on a *Cryptosporidium* bracket reduction equivalent dose). The dose is a function of the flow through the reactors, the applied UV intensity and the UV transmittance (purity) of the filtrate. The reactors are considered to be operating “off-specification” any time when conditions are below a minimum calculated dosage, below a minimum UV transmittance or above a maximum flow rate. **Table 6** summarizes UV equipment performance against the validated operating conditions. An off-specification event is classified as an Adverse Water Quality Incident if UV equipment operates outside of the validated range for a continuous period of 10 minutes. No AWQIs pertaining to UV disinfection performance occurred during the reporting period.

**Table 6:** UV disinfection performance summary

Parameter	Sample Method (Min. Frequency)	Units	Min. Result	Max. Result	Annual Average	Adverse Result
Flow (Combined Filtrate)	Continuous	L/s	n/a	178.5	41.8	>65.0
UV Dosage (Reactor 1)	Continuous	mJ/cm <sup>2</sup>	0	n/a	39.3	<20.0
UV Dosage (Reactor 2)	Continuous	mJ/cm <sup>2</sup>	14.87	n/a	35.8	<20.0
UV Transmittance (Filter 1)	Grab (Daily)	%/1cm	89.2	96.8	92.5	<82.0
UV Transmittance (Filter 2)	Grab (Daily)	%/1cm	89.0	96.8	92.5	<82.0

### 3.5 Nitrate & Nitrite

Treated water is tested for nitrate and nitrite concentrations on a quarterly basis in accordance with Schedule 13 (Chemical sampling and testing) of O. Reg. 170/03. Nitrate and nitrite results are provided in **Table 7**. All results were below the Ontario Drinking Water Quality Standards.

**Table 7:** Nitrate and nitrite results

Sample Date	Nitrate Result (mg/L)	Nitrite Result (mg/L)
12-Feb-2019	0.072	<0.010
14-May-2019	0.046	<0.010
13-Aug-2019	0.105	<0.010
12-Nov-2019	0.057	<0.010
ODWQS	10	1

### 3.6 Trihalomethanes & Haloacetic Acids

Trihalomethanes (THMs) and haloacetic acids (HAAs) are required to be sampled on a quarterly basis from a distribution system location that is likely to have an elevated potential for their formation, in accordance with Schedule 13 (Chemical sampling and testing) of O. Reg. 170/03. Total THM and HAA results are provided in **Table 8** and **Table 9**, respectively.

**Table 8:** Total THM results

Sample Date	Result (µg/L)
12-Feb-2019	58.7
14-May-2019	72.5
13-Aug-2019	102
12-Nov-2019	61.1
Regulatory Average	73.6
ODWQS (RAA)	100

**Table 9:** Total HAA results

Sample Date	Result (µg/L)
12-Feb-2019	61.5
14-May-2019	63.2
13-Aug-2019	86.8
12-Nov-2019	71.3
Regulatory Average	70.7
ODWQS (RAA)	80

Compliance with the provincial standard for trihalomethane concentrations is determined by calculating a running annual average (with a Maximum Acceptable Concentration of 0.100 mg/L or 100 µg/L). A new provincial standard for haloacetic acids, also expressed as a running annual average with a Maximum Acceptable Concentration of 0.080 mg/L or 80 µg/L, came into effect on January 1, 2020. The 2019 running annual averages for THMs and HAAs were below the respective Ontario Drinking Water Quality Standards.

### 3.7 Lead Sampling

Based upon favourable sampling results in the community, the Sioux Lookout Urban DWS previously qualified for reduced lead sampling and ultimately became exempt from sampling at plumbing locations in accordance with Schedule 15.1 (Lead) of O. Reg. 170/03. Six (6) distribution system samples must now be collected every year and analyzed for pH and alkalinity. Additionally, these distribution system samples must be analyzed for lead in every third 12-month period after the plumbing sample exemption was activated. **Table 10** provides the results of lead sampling and related required tests.

**Table 10:** Distribution pH, alkalinity and lead sampling results

Sample Date	Sample Location	pH	Alkalinity (mg/L)	Lead Result <sup>1</sup> (µg/L)
9-Apr-2019	90 Ethel Street	7.6	30	Lead analyses not required in 2019 <sup>2</sup>
9-Apr-2019	Hydrant, Queen St. & 2 <sup>nd</sup> Ave.	7.4	20	
9-Apr-2019	Hydrant, Atwood St. & 3 <sup>rd</sup> Ave.	7.6	25	
14-Oct-2019	90 Ethel Street	7.65	30	
14-Oct-2019	Hydrant, Prince St. & 3 <sup>rd</sup> Ave.	7.61	35	
14-Oct-2019	Hydrant, Lincoln Dr. & Park St.	7.59	30	

1. The Ontario Drinking Water Quality Standard for lead in drinking-water is 10 µg/L.
2. Lead will next be tested in distribution samples during the sampling period corresponding to December 15, 2020 to April 15, 2021, and again during the period corresponding to June 15, 2021 to October 15, 2021. Lead was most recently tested in 2018, and results for all six (6) samples were less than the lower analytical detection limit (<1.0 µg/L).

### 3.8 Inorganic Parameters

Most inorganic parameters are sampled on an annual basis in treated water in accordance with Schedules 13 (Chemical sampling and testing) and 23 (Inorganic parameters) of O. Reg. 170/03. The inorganic parameter sodium is sampled every five (5) years in treated water in accordance with Schedules 13 and 23 of O. Reg. 170/03. Although grab samples may be analyzed, regulatory testing for fluoride is achieved using continuous monitoring equipment at the Sioux Lookout Water Treatment Plant in accordance with Schedule 6 of O. Reg. 170/03.

The most recent inorganic parameter sampling results are provided in **Table 11**. In order to shift the annual sample collection date from February to August in a given calendar year, two sets of treated water samples were collected and tested for most regulated organic parameters in 2019. Results in the table are identical for both sample collection dates unless otherwise indicated, and all results were below the associated Ontario Drinking Water Quality Standards.

### 3.9 Organic Parameters

Organic parameters are sampled on an annual basis in treated water in accordance with Schedules 13 (Chemical sampling and testing) and 24 (Organic parameters) of O. Reg. 170/03. These parameters include various organic acids, pesticides, herbicides, PCBs and other organic chemicals.

Organic parameter sampling results are provided in **Table 12**. In order to shift the annual sample collection date from February to August in a given calendar year, two sets of treated water samples were collected and tested for all regulated organic parameters in 2019. One set of samples was collected on February 12, while the second set of samples was collected on August 13. With the exception of the parameter Benzo(a)pyrene, results in the table are identical for both sample collection dates. All results were below the associated Ontario Drinking Water Quality Standards.

**Table 11:** Inorganic parameter sampling results

Parameter	Sample Date(s)	Units	Result(s)	ODWQS
Antimony	12-Feb-2019, 13-Aug-2019	µg/L	<0.60	6
Arsenic	12-Feb-2019, 13-Aug-2019	µg/L	<1.0	10
Barium	12-Feb-2019, 13-Aug-2019	µg/L	<10	1000
Boron	12-Feb-2019,13-Aug-2019	µg/L	<50	5000
Cadmium	12-Feb-2019, 13-Aug-2019	µg/L	<0.10	5
Chromium	12-Feb-2019; 13-Aug-2019	µg/L	<1.0	50
Fluoride	13-Aug-2019	mg/L	0.595	1.5
Mercury	12-Feb-2019, 13-Aug-2019	µg/L	<0.10	1
Selenium	12-Feb-2019	µg/L	<1.0	50
	13-Aug-2019		<5.0	
Sodium	17-Feb-2015	mg/L	11.8	20
Uranium	12-Feb-2019	µg/L	<2.0	20
	13-Aug-2019		<5.0	

**Table 12:** Organic parameter sampling results

Parameter	Result (µg/L)	ODWQS (µg/L)	Parameter	Result (µg/L)	ODWQS (µg/L)
Alachlor	<0.10	5	Diuron	<1.0	150
Atrazine & Metabolites	<0.20	5	Glyphosate	<5.0	280
Azinphos-methyl	<0.10	20	Malathion	<0.10	190
Benzene	<0.50	1	MCPA	<0.20	100
Benzo(a)pyrene <sup>1</sup>	<0.010; <0.0050	0.01	Metolachlor	<0.10	50
Bromoxynil	<0.20	5	Metribuzin	<0.10	80
Carbaryl	<0.20	90	Monochlorobenzene	<0.50	80
Carbofuran	<0.20	90	Paraquat	<1.0	10
Carbon Tetrachloride	<0.20	2	Pentachlorophenol	<0.50	60
Chlorpyrifos	<0.10	90	Phorate	<0.10	2
Diazinon	<0.10	20	Picloram	<0.20	190
Dicamba	<0.20	120	Total PCBs	<0.035	3
1,2-Dichlorobenzene	<0.50	200	Prometryne	<0.10	1
1,4-Dichlorobenzene	<0.50	5	Simazine	<0.10	10
1,2-Dichloroethane	<0.50	5	Terbufos	<0.20	1
1,1-Dichloroethylene	<0.50	14	Tetrachloroethylene	<0.50	10
Dichloromethane	<5.0	50	2,3,4,6-Tetrachlorophenol	<0.50	100
2,4 -Dichlorophenol	<0.30	900	Triallate	<0.10	230
2,4-D	<0.20	100	Trichloroethylene	<0.50	5
Diclofop-methyl	<0.20	9	2,4,6-Trichlorophenol	<0.50	5
Dimethoate	<0.10	20	Trifluralin	<0.10	45
Diquat	<1.0	70	Vinyl Chloride	<0.20	1

1. The treated water sample collected on February 12 and tested for Benzo(a)pyrene yielded a result of < 0.010 µg/L. The treated water sample collected on August 13 and tested for Benzo(a)pyrene yielded a result of < 0.005 µg/L. An additional treated water sample was collected on April 2 and tested for Benzo(a)pyrene, yielding a result of < 0.010 µg/L. All results were less than the lower analytical detection limit.

## 4 FLOW MONITORING

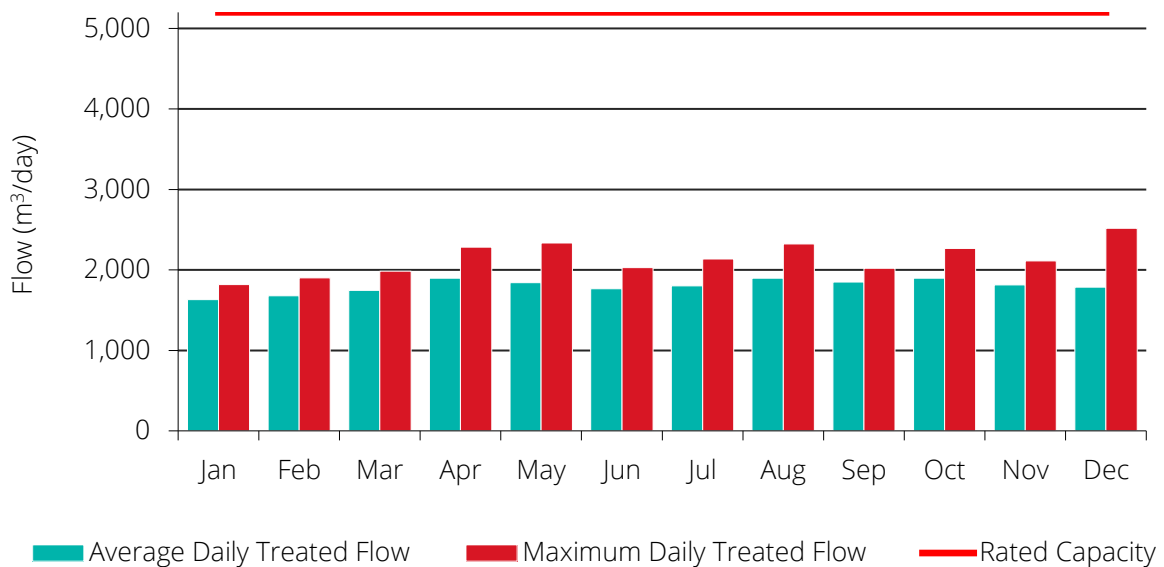
### 4.1 Overview

In accordance with Schedule 22 (Summary Reports for Municipalities) of O. Reg. 170/03, this Annual Report must include certain information for the purpose of enabling the Owner to assess the capability of the system to meet existing and planned uses. Specifically, this Report must include a summary of the quantities and flow rates of the water supplied during the reporting period, including monthly average and maximum daily flows. The Report must also include a comparison of flow monitoring results to the rated capacity and flow rates approved in the system's *Municipal Drinking Water Licence*.

### 4.2 2019 Flow Monitoring Results

Throughout the reporting period the Sioux Lookout Urban DWS operated within its rated capacity and supplied a total of 657,334 m<sup>3</sup> of treated water. On an average day in 2019 1,801 m<sup>3</sup> of treated water was supplied to the community, which represents 35% of the rated capacity of the Sioux Lookout WTP (5,200 m<sup>3</sup>/day). The maximum daily flow in 2019 was 2,517 m<sup>3</sup>/day, which represents 48% of the rated capacity of the facility. Flow monitoring results are summarized in **Figure 1** and **Table 13**.

**Figure 1:** 2019 average and maximum daily treated water flows



**Table 13:** 2019 flow monitoring results summary

Month	Total Volumes (m <sup>3</sup> )		Daily Flows (m <sup>3</sup> /day)		Capacity Assessments <sup>1</sup>	
	Raw Water	Treated Water	Average - Treated Water	Maximum - Treated Water	Average - Treated Water	Maximum - Treated Water
Jan	60,009	50,486	1,629	1,817	31%	35%
Feb	53,618	47,024	1,679	1,900	32%	37%
Mar	63,414	54,128	1,746	1,983	34%	38%
Apr	65,064	56,925	1,898	2,284	36%	44%
May	65,300	57,127	1,843	2,335	35%	45%
Jun	60,767	53,001	1,767	2,027	34%	39%
Jul	64,299	55,833	1,801	2,137	35%	41%
Aug	67,257	58,801	1,897	2,324	36%	45%
Sep	63,318	55,438	1,848	2,021	36%	39%
Oct	66,695	58,779	1,896	2,267	36%	44%
Nov	62,262	54,414	1,814	2,110	35%	41%
Dec	63,578	55,378	1,786	2,517	34%	48%
<b>Total</b>	<b>755,581</b>	<b>657,334</b>	---	---	---	---
<b>Average</b>	<b>62,965</b>	<b>54,778</b>	<b>1,801</b>	---	<b>35%</b>	---

1. Capacity assessments compare average and maximum daily treated water flows to the rated capacity of the treatment facility, as provided within the *Municipal Drinking Water Licence*.

### 4.3 Recent Historical Flows

**Table 14** summarizes recent historical flow monitoring results for the Sioux Lookout Urban DWS. There were no significant changes in the amounts of source water withdrawn and treated water supplied in 2019 when compared to 2018, and system flows have been stable over the previous five years. Total annual volumes of treated water supplied in the near future may be expected to be between 600,000 m<sup>3</sup> and 800,000 m<sup>3</sup>, which represents approximately 32% to 42% of the rated capacity of the Sioux Lookout Water Treatment Plant.



**Table 14:** Recent historical flow monitoring results

Year	Total Volumes (m <sup>3</sup> )		Daily Flows (m <sup>3</sup> /day)		Annual % Change	
	Raw Water	Treated Water	Average – Treated Water	Maximum – Treated Water	Raw Water	Treated Water
2011	888,430	729,341	1,998	3,008	-3.8%	+6.1%
2012	979,670	785,457	2,146	2,837	+10.3%	+7.7%
2013	846,566	697,954	1,912	3,411	-13.6%	-11.1%
2014	710,645	606,465	1,662	2,385	-16.1%	-13.1%
2015	819,063	663,813	1,819	2,495	+15.3%	+9.5%
2016	804,401	679,025	1,855	2,522	-1.8%	+2.3%
2017	782,201	680,914	1,866	3,111	-2.8%	+0.3%
2018	760,142	652,723	1,788	2,446	-2.8%	-4.1%
2019	755,581	657,334	1,801	2,517	-0.6%	+0.7%
<b>Average</b>	<b>816,300</b>	<b>683,669</b>	<b>1,872</b>	<b>---</b>	<b>---</b>	<b>---</b>

## 5 COMPLIANCE

### 5.1 Overview

Northern Waterworks Inc. and the Municipality of Sioux Lookout employ an operational strategy that is committed to achieving the following goals:

- 1) Providing a safe and reliable supply of drinking water to the community of Sioux Lookout;
- 2) Meeting or exceeding all applicable legislative and regulatory requirements; and,
- 3) Maintaining and continually improving the operation and maintenance of the system.

The following sections will summarize incidents of regulatory noncompliance and adverse water quality that occurred during the reporting period. NWI is committed to employing timely and effective corrective actions to prevent recurrence of all identified incidents of noncompliance and adverse water quality.

### 5.2 Regulatory Compliance

In accordance with Schedule 22 (Summary Reports for Municipalities) of O. Reg. 170/03, this Report must list any requirements of the *Act*, the regulations, the system's approval, drinking water works permit, municipal drinking water licence, and any orders applicable to the system that were not met at any time during the period covered by the report (i.e. an incident of regulatory noncompliance). Additionally, this Report must specify the duration of the failure and the measures that were taken to correct the failure.

No incidents of regulatory noncompliance were identified during the most recent inspection initiated on July 22, 2019 by Ontario's Ministry of the Environment, Conservation and Parks.

### 5.3 Adverse Water Quality Incidents

In accordance with section 11 (Annual Reports) of O. Reg. 170/03, this Report must summarize any reports made to the Ministry under subsection 18(1) (Duty to report adverse test results) of *the Act* or section 16-4 (Duty to report other observations) of Schedule 16 of O. Reg. 170/03. Additionally, this Report must describe any corrective actions taken under Schedule 17 of O. Reg. 170/03 during the period covered by the report.

There were two (2) adverse water quality incidents during the reporting period for the Sioux Lookout Urban Drinking Water System:

- **AWQI No. 148142 (September 19, 2019)**

NWI received notice from the licensed laboratory that a routine distribution water sample collected on September 17 tested present for the parameter total coliforms. The issue was reported to the Ministry's Spills Action Centre and to the Northwestern Health Unit on September 19.

Corrective action was performed in accordance with Schedule 17 of O. Reg. 170/03 and included collecting two sets of resamples on September 20 and September 22. All resamples tested absent for E. coli and total coliform parameters and no additional corrective actions were indicated. The *Notice of Issue Resolution* was provided on September 24.

- **AWQI No. 149036 (November 19, 2019)**

An operational indicator of adverse water quality occurred following the loss of continuously monitored data for UV disinfection parameters at the Sioux Lookout Water Treatment Plant. Data pertaining to UV disinfection parameters was lost for approximately 40 minutes following a communication failure originating at one of the facility's programmable logical controllers (PLCs). Notably, alarm systems remained functional during the incident. The event was reported to regulatory authorities as a precautionary measure and it was subsequently confirmed that the event did not constitute an adverse water quality incident. The issue was reported to the Ministry's Spills Action Centre and to the Northwestern Health Unit on November 19.

Corrective action was performed in accordance with Schedule 17 of O. Reg. 170/03 and included restoring continuous monitoring and recording systems. Automation systems were also improved to prevent incident recurrence. Specifically, operational data from the UV reactors were subsequently routed directly to the facility's main PLC rather than relying on a second PLC to relay the data. Communication alarms were also configured for both UV reactors such that water production will cease if communication from the UV reactors fails. The *Notice of Issue Resolution* was provided on November 29.