

2018 ANNUAL REPORT

Ear Falls Drinking Water System



NORTHERN
WATERWORKS INC.

Prepared by Northern Waterworks Inc. on behalf of the Township of Ear Falls

CONTENTS

1	INTRODUCTION	3
1.1	Annual Reporting Requirements	3
1.2	Report Availability	3
2	SYSTEM OVERVIEW	4
2.1	System Description.....	4
2.2	System Expenses	5
2.3	Water Treatment Chemicals.....	6
3	WATER QUALITY	7
3.1	Overview	7
3.2	Microbiological Parameters.....	7
3.3	Operational Parameters.....	8
3.4	Conventional Filtration Performance	9
3.5	Nitrate & Nitrite	9
3.6	Trihalomethanes & Haloacetic Acids.....	10
3.7	Lead Sampling	10
3.8	Inorganic Parameters	11
3.9	Organic Parameters.....	11
4	FLOW MONITORING	14
4.1	Overview	14
4.2	2018 Flow Monitoring Results.....	14
4.3	Recent Historical Flows.....	15
5	COMPLIANCE	17
5.1	Overview	17
5.2	Regulatory Compliance	17
5.3	Adverse Water Quality Incidents.....	17

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, 2018).

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 Ear Falls Municipal Office and on NWI's website (nwi.ca/publications).

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.

2 SYSTEM OVERVIEW

2.1 System Description

The Ear Falls Drinking Water System (DWS No. 210000256) 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 Ear Falls Drinking Water System (DWS) is classified as a large municipal residential system and is composed of the Raw Water Pumping Station, the Ear Falls Water Treatment Plant (WTP) and the Ear Falls water distribution system. The system is owned by the Corporation of the Township of Ear Falls and is operated, maintained and managed by Northern Waterworks Inc. Potential pathogenic organisms are removed and inactivated by chemical coagulation, flocculation, clarification, rapid sand filtration and free chlorine disinfection processes.

Pumps located at the Raw Water Pumping Station transfer source water from the English River and through a short transmission line to the two circular solids contact clarifiers at the Ear Falls WTP. Polyaluminum chloride (coagulant) is injected and rapidly mixed into the raw water before it enters the flocculating centre chamber of the respective solids contact clarifiers. To promote floc formation, water is gently mixed in the flocculating chamber and polymer is added to form larger and more stable floc aggregates. Process water then enters the clarifier proper, where its velocity is reduced to allow for the separation and settling of floc. Process water flows outward and upward through a maintained floc blanket until supernatant overflows into effluent launders and is directed to two two-compartment dual media high rate gravity filters (designated as filters 1 through 4). Settled floc (sludge) is automatically removed from the bottom of the clarifier units.

Impurities that were not captured and settled as floc in the clarifier are removed by passing water through dual media filters composed of anthracite and silica sand on a layer of support gravel. Sodium hypochlorite (disinfectant) and sodium hydroxide (pH adjustment) are added to the filtrate as it is directed from the filters to the treated water storage reservoir. The filters are periodically cleaned by reversing the flow of water through the filter.

Sodium hypochlorite mixes with the water in the reservoir and disinfected water is held in the reservoir for a sufficient amount of time to achieve primary disinfection. Treated water is then delivered from the reservoir to the community standpipe and distribution system using pumps located at the WTP. Secondary disinfection requirements in the water distribution system are achieved by maintaining a free chlorine residual at all locations.

2.2 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 2018 are summarized in **Table 1**.

Table 1: Major expenses incurred in 2018.

Category	Description	Expense
New Equipment/Replace	Sodium hydroxide chemical feed system upgrades ¹	\$23,329
New Equipment/Replace	Coagulant chemical feed system upgrades	\$6,447
New Equipment/Replace	Sodium hypochlorite chemical feed system upgrades	\$4,294
Inventory/Replace	Chlorine and pH inline analyzer sensors	\$3,031
New Equipment	Pressure transmitter for high lift pump discharge header	\$2,355
Maintenance	Thermographic inspection of electrical networks	\$1,989
Replace	Air dryer for compressor system	\$1,854
New Equipment	Emergency eyewash and shower stations (2)	\$1,691
Maintenance	Flow meter calibration verifications	\$565
<p>1. This project included the installation of a new chemical metering panel and associated pumps, the installation of a spill containment structure, the purchase of a barrel pump for transferring chemical solution, and the installation of suction and discharge piping and related appurtenances.</p>		

2.3 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 2**). All chemicals used in the treatment process are NSF/ANSI 60 certified for use in potable water, as required by system approvals.

Table 2: Water treatment chemicals used in 2018.

Treatment Chemical	Application
polyaluminum chloride (SternPAC)	coagulant
polymer (Magnafloc LT22s)	flocculant
sodium hypochlorite	disinfectant
sodium hydroxide (50%)	pH/alkalinity adjustment

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 analyses are performed on source, treated, and distribution system water. 216 routine water samples were collected for microbiological analysis by an accredited laboratory in 2018, as required by Schedule 10 (Microbiological sampling and testing) of O. Reg. 170/03. These water 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 provided in **Table 3**. All results were below the associated Ontario Drinking Water Quality Standards.

Table 3: Microbiological sampling results.

Sample Type	# of Samples	EC Results Range ¹ (MPN/100mL)	TC Results Range ¹ (MPN/100mL)	# of HPC Samples	HPC Results Range (CFU/mL)
Raw Water	51	<1 to 6	<1 to 1550	---	---
Treated Water	51	absent	absent	51	0 to 3
Distribution	114	absent	absent	114	0 to 1
Treated Water (Nonroutine)	1	absent	absent	1	0
Distribution (Nonroutine)	1	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.

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, and the free chlorine residuals associated with primary and secondary disinfection. The Ear Falls DWS employs a comprehensive monitoring program 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.

Table 4: Results summary for operational parameters.

Parameter (Sample Type) ¹	Sample Method (Minimum Frequency)	Units	Minimum Result	Maximum Result	Annual Average	Adverse Result ²
Turbidity (Raw Water)	Grab (4x weekly)	NTU	1.42	20.3	4.58	n/a
Turbidity (Filter 1)	Continuous	NTU	0.023	0.329	0.044	>1.0
Turbidity (Filter 2)	Continuous	NTU	0.028	0.250	0.044	>1.0
Turbidity (Filter 3)	Continuous	NTU	0.019	0.280	0.042	>1.0
Turbidity (Filter 4)	Continuous	NTU	0.028	0.602	0.045	>1.0
Turbidity (Treated)	Grab (Daily)	NTU	0.06	0.22	0.10	n/a
pH (Treated)	Grab (4x weekly)	---	6.7	8.1	7.2	n/a
FCR (Treated)	Continuous	mg/L	0.37	3.19	1.89	n/a ³
FCR (Distribution)	Grab (Daily)	mg/L	0.53	1.79	n/a ⁴	<0.05

1. FCR = free chlorine residual.
2. Adverse results are prescribed within Schedule 16 of O. Reg. 170/03. There are additional factors not included in the table that are necessary to determine whether a result is adverse, such as its duration and whether water is being directed to the next stage of the treatment process.
3. 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.
4. 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 result collected across all locations in the calendar year.

3.4 Conventional Filtration Performance

In accordance with the *Procedure for Disinfection of Drinking Water in Ontario*, conventional filtration facilities must meet certain performance criteria in order to claim removal credits for *Cryptosporidium* oocysts, *Giardia* cysts, and viruses. In addition to continuously monitoring filtrate turbidity and other requirements, filtrate turbidity must be less than or equal to 0.3 NTU in at least 95% of the measurements each month. **Table 5** summarizes filtrate turbidity compliance against the <0.3 NTU/95% 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 0.3 NTU in a calendar month in 2018.

Table 5: Filtration performance.

Filter	Minimum Result	Maximum Result	Adverse Result
Filter 1	99.95%	100%	<95%
Filter 2	100%	100%	<95%
Filter 3	100%	100%	<95%
Filter 4	99.94%	100%	<95%

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 6**. All results were below the Ontario Drinking Water Quality Standards.

Table 6: Nitrate and nitrite results.

Sample Date	Nitrate Result (mg/L)	Nitrite Result (mg/L)
12-Feb-2018	0.069	<0.010
14-May-2018	0.045	<0.010
13-Aug-2018	0.021	<0.010
12-Nov-2018	<0.020	<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 summarized in **Table 7** and **Table 8**, respectively. 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). In 2018, the running annual average for THMs was 62.2 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, will come into effect on January 1, 2020. In 2018, additional samples were collected and analyzed for total haloacetic acids in an effort to characterize HAA formation in the water distribution system.

Table 7: Total THM results.

Sample Date	Result (µg/L)
12-Feb-2018	36.6
14-May-2018	50.6
13-Aug-2018	92.5
12-Nov-2018	69.1
Regulatory Average	62.2
ODWQS (RAA)	100

Table 8: Total HAA results.

No. of Distribution Sample Points	3
No. of Distribution Samples	12
Minimum Result (µg/L)	30.7
Maximum Result (µg/L)	111
Regulatory Average (µg/L)	67.5
Future ODWQS (RAA)	80

3.7 Lead Sampling

The Ear Falls Drinking Water System was previously required to develop a *Corrosion Control Plan* in 2010 following unfavourable results associated with the community lead sampling program. The system now adheres to the lead monitoring program outlined in its *Municipal Drinking Water Licence*, which requires the collection of treated water samples on a quarterly basis and distribution and plumbing samples on an annual basis. **Table 9** summarizes the results of community lead sampling conducted in 2018. Notably, corrosion control measures for the system were formally implemented on September 17, 2018, following the rehabilitation of the sodium hydroxide chemical feed system. Sodium hydroxide is now used to increase water pH to a level that will minimize the release of lead from plumbing systems.

Table 9: Lead sampling results summary.

Sample Type	Treated	Distribution	Plumbing
Total No. of Sample Points ¹	1	4	12
Total No. of Samples	4	4	24
Minimum Result (µg/L)	<1.0	<1.0	<1.0
Maximum Result (µg/L)	<1.0	2.3	9.9
No. of Sample Points greater than ODWQS (>10 µg/L)	0	0	0
No. of Samples greater than ODWQS (>10 µg/L)	0	0	0
No. of Samples between LDL ² and ODWQS (1 - 10 µg/L)	0	2	17
No. of Samples below LDL (<1.0 µg/L)	4	2	7

1. In accordance with the sampling protocol outlined in Schedule 15.1 of O. Reg. 170/03, two samples are collected and analyzed for lead at each sample point for plumbing samples.
 2. LDL = lower detectable limit (i.e. <1.0 µg/L); lead concentrations below the LDL are not detected by the analytical method.

3.8 Inorganic Parameters

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. Sodium and fluoride are sampled every five (5) years in treated water in accordance with Schedules 13 and 23 of O. Reg. 170/03. The most recent inorganic parameter sampling results are provided in **Table 10**. 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 acids, pesticides, herbicides, PCBs, volatile organics, and other organic chemicals. Organic parameter sampling results are provided in **Table 11**. Sampling for all organic parameters was conducted on February 12, 2018. All results were below the associated Ontario Drinking Water Quality Standards.

Table 10: Inorganic sampling results.

Parameter	Sample Date	Units	Result	ODWQS
Antimony	12-Feb-2018	µg/L	<0.60	6
Arsenic	12-Feb-2018	µg/L	<1.0	10
Barium	12-Feb-2018	µg/L	<10	1000
Boron	12-Feb-2018	µg/L	<50	5000
Cadmium	12-Feb-2018	µg/L	<0.10	5
Chromium	12-Feb-2018	µg/L	<1.0	50
Fluoride	26-Jan-2017	mg/L	<0.020	1.5
Mercury	12-Feb-2018	µg/L	<0.10	1
Selenium	12-Feb-2018	µg/L	<1.0	50
Sodium	26-Jan-2017	mg/L	3.23	20
Uranium	12-Feb-2018	µg/L	<2.0	20

Table 11: 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	<0.010	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	<0.40	190
Dicamba	<0.20	120	Total PCBs ¹	<35	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 detection limit for the parameter Total PCBs exceeded the Ontario Drinking Water Quality Standard. Historically, Total PCBs have never exceeded 0.035 µg/L.

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 2018 Flow Monitoring Results

Throughout the reporting period, the Ear Falls DWS operated within its rated capacity and supplied a total of 454,171 m³ of treated water. On an average day in 2018, 1,244 m³ of treated water was supplied to the community, which represents 27% of the rated capacity of the Ear Falls WTP (4,550 m³/day). The maximum daily flow in 2018 was 1,992 m³/day, which represents 44% of the rated capacity of the facility. Flow monitoring results are summarized in Figure 1 and Table 12.

Figure 1: 2018 average and maximum daily treated water flows.

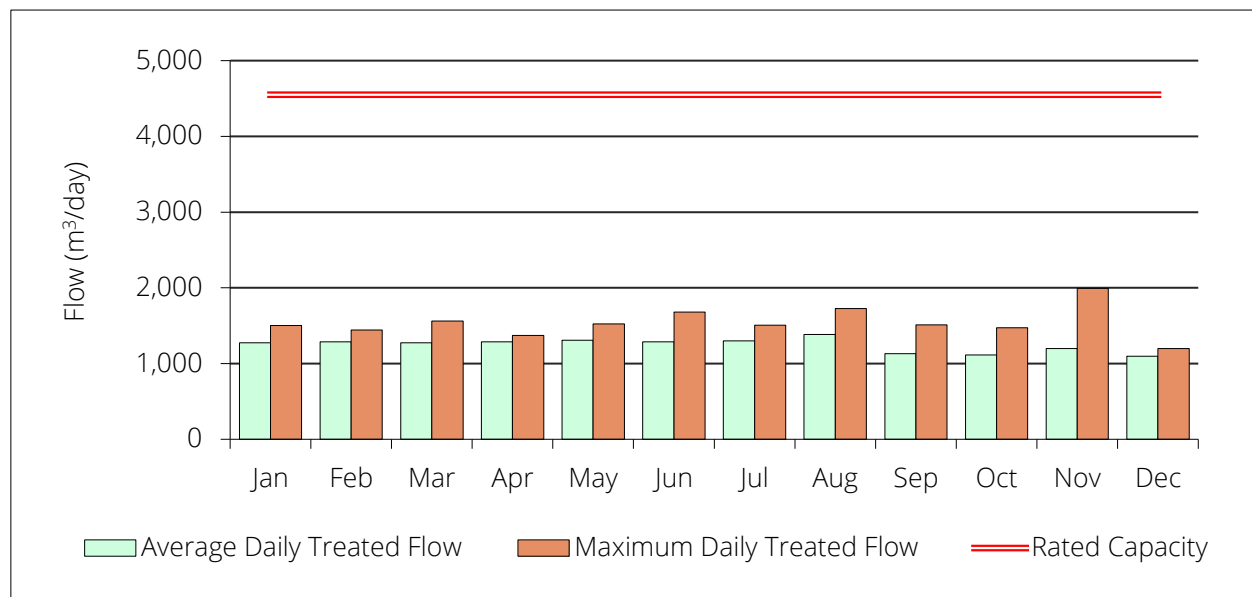


Table 12: 2018 total volumes, daily flows and capacity assessments.

Month	Total Volumes (m ³)		Daily Flows (m ³ /day)		Capacity Assessments ¹	
	Raw Water	Treated Water	Average - Treated Water	Maximum - Treated Water	Average - Treated Water	Maximum - Treated Water
Jan	42,059	39,445	1,272	1,502	28%	33%
Feb	38,153	36,035	1,287	1,444	28%	32%
Mar	41,119	39,550	1,276	1,563	28%	34%
Apr	38,894	38,582	1,286	1,371	28%	30%
May	40,666	40,531	1,307	1,522	29%	33%
Jun	39,072	38,627	1,288	1,681	28%	37%
Jul	40,204	40,241	1,298	1,507	29%	33%
Aug	43,227	42,875	1,383	1,724	30%	38%
Sep	33,687	33,888	1,130	1,512	25%	33%
Oct	35,420	34,480	1,112	1,474	24%	32%
Nov	36,767	35,902	1,197	1,992	26%	44%
Dec	34,142	34,015	1,097	1,199	24%	26%
Total	463,410	454,171	---	---	---	---
Avg.	38,618	37,848	1,244	---	27%	---

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 13 summarizes recent historical flow monitoring results for the Ear Falls DWS. There were appreciable but manageable increases in the amounts of source water withdrawn and treated water supplied in 2018 when compared to 2017. Total annual volumes of treated water supplied in the near future may be expected to be between 350,000 m³ and 500,000 m³, which represents approximately 21% to 30% of the rated capacity of the Ear Falls Water Treatment Plant.

Table 13: Recent historical flow monitoring results.

Year	Total Volumes (m ³)		Daily Flows (m ³ /day)		Annual % Change	
	Raw Water	Treated Water	Average – Treated Water	Maximum – Treated Water	Raw Water	Treated Water
2014	400,171	373,727	1,024	2,088	---	---
2015	363,524	359,631	985	1,602	-9.2%	-3.8%
2016	361,276	353,791	967	1,498	-0.6%	-1.6%
2017	415,125	394,183	1,080	1,781	+14.9%	+11.4%
2018	463,410	454,171	1,244	1,992	+11.6%	+15.2%

5 COMPLIANCE

5.1 Overview

Northern Waterworks Inc. and the Township of Ear Falls 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 Ear Falls;
- 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 November 1, 2018 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 three (3) adverse water quality incidents during the reporting period for the Ear Falls Drinking Water System:

- **AWQI No. 141901 (August 21, 2018)**

As per Ontario's *Watermain Disinfection Procedure*, a distribution system repair was classified as a Category 2 event and constituted an observation of improper disinfection. The repair affected users on Short Shelski Lane, Morowski Lane and the Ear Falls Community Health Care. The issue was reported to the Ministry's Spills Action Centre and the Northwestern Health Unit on August 21, 2018.

Corrective actions included completing the repair, restoring pressure, issuing a localized and precautionary Boil Water Advisory, flushing water lines and collecting a microbiological sample. The sample tested absent for E. coli and total coliform parameters and the Boil Water Advisory was subsequently rescinded. The Notice of Issue Resolution was provided on August 31, 2018.

- **AWQI No. 143339 (October 3, 2018)**

An operational indicator of adverse water quality occurred following a loss of coagulant addition at the Ear Falls Water Treatment Plant. The loss of coagulant addition was identified as an observation of improper disinfection. The issue was reported to the Ministry's Spills Action Centre and the Northwestern Health Unit on October 3, 2018. Corrective action was performed in accordance with Schedule 17 of O. Reg. 170/03, and included restoring coagulant addition and treatment processes. The Notice of Issue Resolution was provided on October 3, 2018.

- **AWQI No. 143847 (November 1, 2018)**

As per Ontario's *Watermain Disinfection Procedure*, a distribution system repair was initially classified as a Category 2 event and constituted an observation of improper disinfection. The issue was reported to the Ministry's Spills Action Centre and the Northwestern Health Unit on November 1, 2018. After the immediate report the repair was reclassified as a Category 1 event, and no corrective actions beyond localized water main flushing were indicated. The Notice of Issue Resolution was provided on November 1, 2018.