

# **2018 ANNUAL PERFORMANCE REPORT**

## **BIRR WATER TREATMENT PLANT**



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## INTRODUCTION

The Municipality of Middlesex Centre is preparing a report summarizing system operation and water quality for every municipal drinking water system annually. The reports detail the latest water quality testing results, water quantity statistics and any adverse conditions that may have occurred for the previous year. They are available for review by the end of February on the Municipality of Middlesex Centre website at [www.middlesexcentre.on.ca/Public/drinking water](http://www.middlesexcentre.on.ca/Public/drinking_water) or by contacting the Public Works Department.

All efforts have been made to ensure the information presented in this report is accurate. If you have any questions or comments concerning the report please contact the Municipality of Middlesex Centre.

**Table 1 – Plant Information**

Drinking Water System	Birr Well Supply System
Drinking Water System Number	220005492
Drinking Water System Owner & Contact Information	Municipality of Middlesex Centre Small Municipal Residential System 10227 Ilderton Road, RR #2 Ilderton, Ontario N0M 2A0
Reporting Period	January 1, 2018 to December 31, 2018

## SECTION A – SYSTEM DESCRIPTION

The Birr Drinking Water System is owned by the Municipality of Middlesex Centre and operated by the Municipality of Middlesex Centre. The Birr Drinking Water System is a ground water supply system serving the Village of Birr that presently services 18 lots on Gwendolyn St with an estimated population of 53 residents. This system consists of one (1) drilled well, rated at 88m<sup>3</sup>/day operating under the Permit to Take Water # 3415-A3JHTY. Raw well water is pumped from the well into a concrete reservoir. The water is disinfected using a sodium hypochlorite disinfection system, consisting of one storage tank and two chemical metering pumps (one duty and one standby) with a feed line discharging into the underground reservoir. Two submersible high lift pumps, then pump the water through a 150mm water main to the distribution system. The system operates under Municipal Drinking Water License Number 052-104 and Drinking Water Works Permit Number 052-204.

The system is maintained by licensed water system operators, who operate treatment and monitoring equipment and collect samples as specified by the Regulation. Alarms automatically notify operators in the event of failure of critical operational requirements. The water treatment chemicals used on site is a 6% sodium hypochlorite.

## SECTION B – MODIFICATIONS & REPLACEMENTS

Modifications & Replacements
No major upgraded or Form 2 Record of Minor Modifications or Replacements to the Drinking Water System

## SECTION C – MICROBIOLOGICAL TESTING

### (I) *E. COLI & TOTAL COLIFORM*

Bacteriological tests for E. coli and total coliforms are collected from the raw water at the facility and treated water from the distribution system. Raw water is collected monthly and the distribution water is collected on a bi-weekly schedule. Extra samples are taken after major repairs or maintenance work. Any E. coli or total coliform results above 0 in the treated distribution water must be reported to the Ministry of the Environment, Conservation and Parks (MECP) and Medical Officer of Health (MOH). Resamples and any other required actions are taken as quickly as possible. The results from the 2018 sampling program are shown on the table below. There were no adverse test results from 26 distribution water samples in this reporting period.

**TABLE 2 – E. COLI & TOTAL COLIFORM SAMPLES**

	Number of Samples	Range of E. coli Results Min – Max	Range of Total Coliform Results Min – Max
Raw	13	0	0
Distribution	26	0	0

### (II) *HETEROTROPHIC PLATE COUNT (HPC)*

HPC analyses are required from the distribution water on a bi-weekly basis. HPC should be less than 500 colonies per 1 mL. Results over 500 colonies per 1 mL may indicate a change in water quality but it is not considered an indicator of unsafe water. The 2018 results are shown in the table below.

**TABLE 3 – HETEROTROPHIC PLATE COUNT (HPC) SAMPLES**

Parameters	Number of Samples	Range of HPC Results Min-Max
Distribution	26	<10 – 10

## SECTION D – CHEMICAL TESTING

The Safe Drinking Water Act requires periodic testing of the water for chemical parameters. The sampling frequency varies for different types and sizes of water systems. If the concentration of a parameter is above half of the Maximum Allowable Concentration (MAC) under the Ontario Drinking

Water Quality Standards, an increased testing frequency of once every three months is required by the Regulation. Where concerns regarding a parameter exist, the MECP can also require additional sampling be undertaken.

Nitrate and nitrite samples are required every 3 months in normal operation.

**TABLE 4 – QUARTERLY NITRATE & NITRITE**

Parameter & Sample Date	Result (mg/l)	MAC (mg/l)	Exceedance
<b>Nitrate</b>			
1st Quarter	0.014	10.0	No
2nd Quarter	0.014	10.0	No
3rd Quarter	0.006	10.0	No
4th Quarter	0.017	10.0	No
<b>Nitrite</b>			
1st Quarter	<0.003	1.0	No
2nd Quarter	<0.003	1.0	No
3rd Quarter	0.003	1.0	No
4th Quarter	0.003	1.0	No

Trihalomethane (THM) and total Haloacetic Acids (HAA) are by-products of the disinfection process. The samples are required every 3 months from the distribution system.

**TABLE 5 – QUARTERLY TRIHALOMETHANE & HALOACETIC ACID**

Parameter & Sample Date	Result (mg/l)	Annual Rolling Average (mg/l)	MAC (mg/l)	Exceedance
<b>Trihalomethane</b>				
1st Quarter	0.054	0.055	100	No
2nd Quarter	0.044	0.044	100	No
3rd Quarter	0.047	0.047	100	No
4th Quarter	0.053	0.053	100	No
<b>Haloacetic Acid (HAA)</b>				
1st Quarter	0.043	0.037	80	No
2nd Quarter	0.043	0.042	80	No
3rd Quarter	0.034	0.039	80	No
4th Quarter	0.031	0.039	80	No

The following Table summarizes the most recent test results for Sodium and Fluoride. Testing and reporting any adverse results is required every 5 years.

**TABLE 6 – SODIUM & FLUORIDE**

Parameter	Sample Date	Result Value (mg/L)	MAC (mg/L)
Sodium	January 2, 2017	39.2*	20
Sodium	January 9, 2017	43.1*	20
Fluoride	January 2, 2017	1.34*	1.5

\*Sodium levels between 20 – 200 mg/L must be reported every 5 years.

\*\*Natural levels of fluoride between 1.5 – 2.4 mg/L must be reported every 5 years.

The following Table summarizes the most recent results for the Lead Testing Program. Lead samples are taken twice per year, in the winter sample period and the summer sample period as outlined below. Alkalinity and pH are monitored twice per year in the distribution system to ensure water quality is consistent and does not facilitate leaching of lead into the water.

**TABLE 7 – LEAD SAMPLING**

Parameter	Result Value	MAC	Exceedance
<b>Winter Sample (Dec. 15 – April 15)</b>			
Lead (ug/l)	0.18	10	No
Distribution Alkalinity (mg/l)	202	*30 - 500	No
Distribution pH	8.13	-	No
<b>Summer Sample (June 15 – Oct. 15)</b>			
Lead (ug/l)	0.11	10	No
Distribution Alkalinity	205	*30 – 500	No
Distribution pH	7.30	-	No

\*Distribution alkalinity is an aesthetic objective / Operational Guideline with a range between 30 mg/l to 500 mg/l

The following Table summarizes the most recent test results for Schedules 23 and 24. Testing is required every 5 years for secure groundwater wells.

**TABLE 8 – SCHEDULE 23 & 24**

Parameter	Sample Date	Treated Water Value (ug/l)	Exceedance
Antimony	01/02/2017	ND	No
Arsenic	01/02/2017	ND	No
Barium	01/02/2017	502	No
Barium	01/02/2017	489	No
Barium	01/02/2017	484	No
Boron	01/02/2017	201	No
Cadmium	01/02/2017	0.012	No
Chromium	01/02/2017	0.58	No
Mercury	01/02/2017	ND	No
Selenium	01/02/2017	ND	No
Uranium	01/02/2017	0.023	No
Alachlor	01/02/2017	ND	No
Atrazine + N-dealkylated metabolites	01/02/2017	ND	No
Atrazine	01/02/2017	ND	No
Densethyl atrazine	01/02/2017	ND	No
Azinphos-methyl	01/02/2017	ND	No
Benzene	01/02/2017	ND	No
Benzo(a)pyrene	01/02/2017	ND	No
Bromoxynil	01/02/2017	ND	No

Carbaryl	01/02/2017	ND	No
Carbofuran	01/02/2017	ND	No
Carbon Tetrachloride	01/02/2017	ND	No
Chlorpyrifos	01/02/2017	ND	No
Chlorpyrifos	01/02/2017	ND	No
Diazinon	01/02/2017	ND	No
Dicamba	01/02/2017	ND	No
1,2-Dichlorobenzene	01/02/2017	ND	No
1,4-Dichlorobenzene	01/02/2017	ND	No
1,2-Dichloroethane	01/02/2017	ND	No
1,1-Dichloroethylene (vinylidene chloride)	01/02/2017	ND	No
Dichloromethane	01/02/2017	ND	No
2,4 Dichlorophenol	01/02/2017	ND	No
2,4-Dichlorophenoxy acetic acid (2,4-D)	01/02/2017	ND	No
Diclofop-methyl	01/02/2017	ND	No
Dimethoate	01/02/2017	ND	No
Diquat	01/02/2017	ND	No
Diuron	01/02/2017	ND	No
Glyphosate	01/02/2017	ND	No
Malathion	01/02/2017	ND	No
2-methyl- 4chlorophenoxyacetic acid (MCPA)	01/02/2017	ND	No
Metolachlor	01/02/2017	ND	No
Metribuzin	01/02/2017	ND	No
Monochlorobenzene	01/02/2017	ND	No
Paraquat	01/02/2017	ND	No
Pentachlorophenol	01/02/2017	ND	No
Phorate	01/02/2017	ND	No
Picloram	01/02/2017	ND	No
Polychlorinated Biphenyls(PCB)	01/02/2017	ND	No
Prometryne	01/02/2017	ND	No
Simazine	01/02/2017	ND	No
Terbufos	01/02/2017	ND	No
Tetrachloroethylene	01/02/2017	ND	No
2,3,4,6-Tetrachlorophenol	01/02/2017	ND	No
Triallate	01/02/2017	ND	No
Trichloroethylene	01/02/2017	ND	No
2,4,6-Trichlorophenol	01/02/2017	ND	No
Trifluralin	01/02/2017	ND	No
Vinyl Chloride	01/02/2017	ND	No

ND = Non-Detect

## SECTION E - OPERATIONAL MONITORING

### (I) CHLORINE RESIDUAL

Free chlorine levels of the treated water are monitored continuously at the discharge point of the Water Treatment Facility. In the distribution system, free chlorine is checked twice weekly at various locations throughout the distribution system. As a target, free chlorine residual within the distribution system should be above 0.20 mg/L. A free chlorine level lower than 0.05 mg/L must be reported and corrective action taken. There were no reportable incidents in 2018. A summary of the chlorine residual readings is provided in the table below.

TABLE 4 – CHLORINE RESIDUALS

Parameter	Number of Tests or Monitoring Frequency	Range of Results (Min – Max)
Chlorine residual in distribution (mg/l)	104	0.59 – 1.48
Chlorine residual after treatment (mg/L)	Continuous	0.25 – 3.55

### (I) TURBIDITY

Turbidity of treated water is continuously monitored at the treatment facility, as a change in turbidity can indicate an operational problem. The turbidity of untreated water from the well is checked monthly. Turbidity is measured in nephelometric turbidity units (NTU). Under Regulation 170/03 turbidity in groundwater is not reportable, however turbidity should be < 1 NTU at the treatment plant and < 5 NTU in the distribution system. A summary of the monitoring results for 2018 is provided in the table below.

TABLE 5 – TURBIDITY

Parameter	Number of Tests or Monitoring Frequency	Range of Results (Min – Max)
Turbidity after treatment (NTU)	Continuous	0.08 – 1.25

## SECTION F - WATER QUANTITY

Continuous monitoring of flowrates from supply wells into the treatment system and from the facility into the distribution system is required by Regulation 170/03. The Municipal Drinking Water License and Permit to Take Water issued by the MECPC regulate the amount of water that can be utilized over a given time period. A summary of the 2018 flows are provided below.

TABLE 9 – FLOW DATA

Flow Summary	Quantity
Permit to Take Water Limit	82 m <sup>3</sup> /d
Municipal Drinking Water License Limit	88.4 m <sup>3</sup> /d

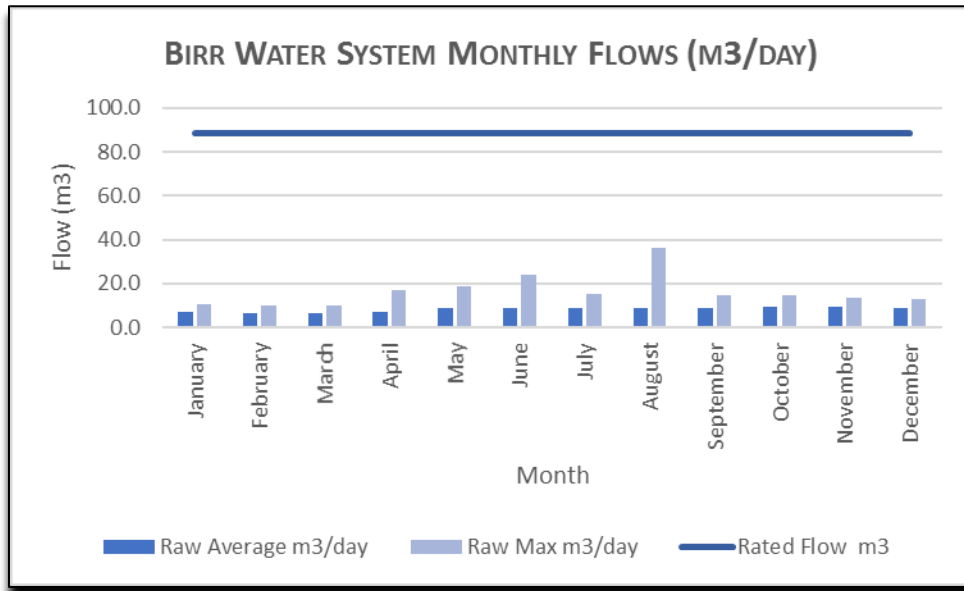


2018 Average Daily Flow	8.2 m <sup>3</sup> /d
2018 Maximum Daily Flow	36.4 m <sup>3</sup> /d
2018 Average Monthly Flow	250.4 m <sup>3</sup>
2018 Total Amount of Water Supplied	3,005 m <sup>3</sup>

**TABLE 10 – MONTHLY FLOWS**

		Jan	Feb	March	April	May	June	July	August	September	October	November	December	Average
Rated Flow	m <sup>3</sup>	88.4	88.4	88.4	88.4	88.4	88.4	88.4	88.4	88.4	88.4	88.4	88.4	
Raw Average	m <sup>3</sup> /d	7.2	6.8	6.2	7.2	9.0	8.8	8.6	9.0	8.7	9.1	9.2	8.9	<b>8.2</b>
Raw Max	m <sup>3</sup> /d	10.4	9.7	10.1	16.8	18.7	23.7	15.2	36.4	14.9	14.4	13.7	13.1	

**GRAPH 1 – MONTHLY FLOWS (M<sup>3</sup>/DAY)**



**SECTION G - NON- COMPLIANCE FINDINGS & ADVERSE RESULTS**

Non-compliance issues are typically identified by either the Operating Authority or the MECP Drinking Water Inspectors. All non-compliance issues are investigated, corrective actions taken and documented using the Municipalities Drinking Water Quality Management System (DWQMS) procedures.

**(I) NON- COMPLIANCE FINDINGS**

The MECP conducted an announced routine inspection of the Birr Drinking Water System on July 5, 2018. The MECP inspector identified two (2) non-compliances with the regulatory requirements.

1. The owner/operating authority was not in compliance with the requirement to prepare Form 2 documents as required by their Drinking Water Works Permit during the inspection period. At the time of the site inspection, a new online chlorine analyzer was observed that is understood to have been installed on August 10, 2017 in place of an older unit. It is further understood that the Owner / Operating Authority did not complete a Form 2 document related to this modification as required by Drinking Water Works Permit # 052204 – Issue #3, Section 4.0.

Action(s) Required: None. Since being notified of this issue as part of the inspection, the Owner / Operating Authority immediately completed the pertinent Form 2 and submitted it to the Ministry of the Environment, Conservation and Parks.

2. All nitrate/nitrite water quality monitoring requirements prescribed by legislation were not conducted within the required frequency for the DWS. Ontario Regulation 170/03 – Schedule 13-7 stipulates that nitrate and nitrite are required to be collected and tested every three months from the treated water within the required frequency as prescribed by Ontario Regulation 170/03 – Schedule 6-1.1(4).

According to documentation provided for review from the Owner / Operating Authority, samples were collected from the Treatment Plant on the following dates:

1. January 2, 2017
2. April 3, 2017
3. July 6, 2017
4. October 2, 2017
5. February 2, 2018
6. April 2, 2018

Based on the aforementioned tests, the Owner / Operating Authority did collect the appropriate number of nitrate and nitrite samples for testing, however, the appropriate time period between the samples collected on October 2, 2017, February 2, 2018, and April 2, 2018 did not meet the appropriate frequency of testing as prescribed by Ontario Regulation 170/03 – Schedule 6-1.1(4). Generally stated, a sample that is required to be collected every three months has an acceptable window for sample collection of between 60 to 120 days. As presented below, the aforementioned samples were not collected within this acceptable time period:

1. October 2, 2017 to February 2, 2018 --- 123 days
2. February 2, 2018 to April 2, 2018 --- 59 days

Action(s) Required: From herein, the Owner / Operating Authority shall ensure that all samples required to be collected every three months are done so as prescribed by the requirements of Ontario Regulation 170/03 – Schedule 6-1.1(4). Compliance with this requirement will be assessed during the next annual inspection of the water system.

## (II) **ADVERSE RESULTS**

There were no adverse results in 2018.