



2019 Annual Performance & Summary Report Middlesex Centre Distribution System

Date: January 13, 2020

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Introduction

The Municipality of Middlesex Centre prepares 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/services/residents/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 | Middlesex Centre Distribution System |
| Drinking Water System Number | 260004202 |
| Drinking Water System Owner & Contact Information | Municipality of Middlesex Centre Large Municipal Distribution System 10227 Ilderton Road, RR #2 Ilderton, Ontario N0M 2A0 |
| Reporting Period | January 1, 2019 to December 31, 2019 |

Section A – System Description

The Middlesex Centre Distribution System is owned and operated by the Municipality of Middlesex Centre. The system operates under Municipal Drinking Water License Number 052-101 and Drinking Water Works Permit Number 052-201. This system is made up of the following water systems:

- Arva Distribution System
- Ballymote Distribution System
- Delaware Distribution System
- Denfield Distribution System
- Ilderton Distribution System
- Komoka-Kilworth Distribution System

The water supply for the Arva Distribution System is obtained from a 1050 mm pipeline maintained by the City of London Water Supply System. A 200mm ductile-iron pipeline with flow meter and in-line vertical turbine fire pump distributes treated water. There is

an on-line chlorine analyzer and paperless recorder. Two chemical metering pumps are available for secondary disinfection to boost sodium hypochlorite levels.

The Ballymote Distribution System is supplied by a 200mm water main from the City of London. A re-chlorination injection point exists with a portable chlorine feed system, a sampling tap immediately downstream from the injection point and a chlorine analyzer measure free chlorine residual in the water entering the distribution system.

The Delaware Drinking Water System receives water through a 150 mm water main from the City of London Distribution System connection at the Delaware Re-chlorination facility. The re-chlorination facility consists of two chemical metering pumps, a chemical storage tank, flow meter, piping, SCADA and a chlorine residual analyzer. The water is supplied to the distribution and elevated storage tank by an automatic valve and controls.

The water supply for the Denfield Distribution System is obtained from the 1200 mm pipeline of the LHPWSS. High lift pumps at the Denfield reservoir draw from the above ground storage tank and provide water to the distribution system. The Denfield system is equipped with two fixed speed pumps and one variable speed pump. Two sodium hypochlorite disinfection systems are used to boost chlorine entering and leaving the storage tank.

The water supply for the Ilderton distribution system is obtained from the LHPWSS. High lift pumps at the Ilderton reservoir provide water to the distribution system and the tower, which provides pressure for the distribution system. The reservoir is equipped with three high lift pumps. A sodium hypochlorite disinfection system is used to boost chlorine entering the distribution system.

The water supply for the Komoka-Kilworth distribution system is obtained from the LHPWSS. High lift pumps at the Komoka reservoir draw from the above ground storage tank and provide water to the distribution system and the tower. The reservoir is equipped with two high lift pumps. Two sodium hypochlorite disinfection systems are used to boost chlorine entering and leaving the storage tank.

Section B – Water Treatment Chemicals Used

- 12% sodium hypochlorite
- 6% sodium hypochlorite

Section C – Modifications & Replacements

| | |
|---|-------------|
| Modifications & Replacements | |
| Delaware Drinking Water System | |
| Installation of 2,140 m ³ standpipe with associated piping, valves, electrical and mechanical equipment, instrumentation and valve house | \$1,304,838 |
| Ilderton Distribution System | |
| Replaced the analyzer drain pipe, cleaned and inspected Booster Pump Station Reservoir | \$7,977 |
| Ballymote Distribution System | |
| Installation of new water flow meter on watermain | \$1,076.00 |

Section D – Microbiological Testing

(I) E. coli & Total Coliform

Bacteriological tests for E. coli and total coliforms in the distribution water are collected on a weekly schedule in various location throughout the distribution system. Extra samples are taken after major repairs or maintenance work. Any E. coli or total coliform results above 0 in treated distribution water must be reported to the Ministry of 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 2019 sampling program are shown on the table below.

Table 2 – E. Coli & Total Coliform Samples

| | Number of Samples | Range of E. coli Results Min – Max | Range of Total Coliform Results Min – Max |
|--------------|-------------------|---------------------------------------|---|
| Distribution | 239 | 0 - 0 | 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 2019 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 | 104 | <10 – 40 |

Section E – 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.

(I) Trihalomethane (THM) & Haloacetic Acids (HAA)

The Middlesex Distribution System collected samples for Trihalomethane (THM) and total Haloacetic Acids (HAA) which are by-products of the disinfection process. Samples were collected every 3 months from the distribution system.

Table 4 – Quarterly Trihalomethane & Haloacetic Acid

| Parameter & Sample Date | Result (mg/l) | Annual Rolling Average (mg/l) | MAC (mg/l) | Exceedance |
|-------------------------|---------------|-------------------------------|------------|------------|
| Trihalomethane | | | | |
| 1st Quarter | 0.030 | 0.044 | 100 | No |
| 2nd Quarter | 0.035 | 0.041 | 100 | No |
| 3rd Quarter | 0.051 | 0.043 | 100 | No |
| 4th Quarter | 0.050 | 0.042 | 100 | No |
| Haloacetic Acid (HAA) | | | | |
| 1st Quarter | 0.017 | 0.020 | 80 | No |
| 2nd Quarter | 0.021 | 0.019 | 80 | No |
| 3rd Quarter | 0.028 | 0.020 | 80 | No |
| 4th Quarter | 0.018 | 0.021 | 80 | No |

(II) Lead Testing Program

The following Table summarizes the most recent results for the Lead Testing Program. Lead samples are 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.

As identified in Schedule D of the Municipal Drinking Water License #052-101, Middlesex Center was granted Regulatory Relief for Lead sampling. The number of sampling points has been reduced to the following:

Table 5 – Regulatory Relief

| Number of Sampling Points Required for Relief from Regulatory Requirements | | | | |
|--|-------------------------|---|---|---|
| Column 1 Drinking Water System or Drinking Water Subsystem Name | Column 2 DWS Numbers | Column 3 Number of Sampling Points in Plumbing that Serves Private Residences | Column 4 Number of Sampling Points in Plumbing that Does Not Serve Private Residences | Column 5 Number of Sampling Points in Distribution System |
| Middlesex Centre Distribution System | 260004202 | 20 | 2 | 4 |

Table 6 – Lead Sampling

| Parameter | Max Result Values | MAC | Exceedance |
|------------------------------------|-------------------|-----------|------------|
| Winter Sample (Dec. 15 – April 15) | | | |
| Lead (ug/l) | 2.79 | 10 | No |
| Distribution Alkalinity (mg/l) | 85 | *30 - 500 | No |
| Distribution pH | 7.83 | - | No |
| Summer Sample (June 15 – Oct. 15) | | | |
| Lead (ug/l) | 3.60 | 10 | No |
| Distribution Alkalinity | 85 | *30 – 500 | No |
| Distribution pH | 7.03 | - | No |

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

Middlesex Centre Distribution System has been granted Regulatory Relief for lead sampling as outlined in Table 2, Schedule D Conditions for Relief from Regulatory Requirements in the Regulatory Drinking Water Licence # 052-101, Issue #4 dated October 26, 2017. Middlesex Centre is required to take twenty (20) lead samples from plumbing that serve Private Residence, two (2) samples that do not serve private residents and four (4) samples from the distribution system. Samples results from the summer and winter lead sampling period are listed in Appendix A.

Section F – 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 daily at various locations. 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 2019. A summary of the chlorine residual readings is provided in the table below.

Table 7 – Chlorine Residuals

| Parameter | Number of Tests or Monitoring Frequency | Range of Results (Min – Max) |
|---|---|------------------------------|
| Chlorine residual Point of Entry (POE) (mg/L) | Continuous | 0.25 – 4.63 |

Section G – Water Quantity

Continuous monitoring of flowrates from the supply systems to the Middlesex Distribution System is required by Regulation 170/03. The Municipal Drinking Water License and Permit to Take Water issued by the MECP regulate the amount of water that can be utilized over a given time period. A summary of the 2019 flows are provided below.

Table 8 – Arva Water 2019 Flows

| | | Jan | Feb | March | April | May | June | July | Aug | Sept | Oct. | Nov | Dec |
|---------------|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|
| Monthly Total | m ³ | 2,564 | 2,103 | 4,316 | 2,418 | 2,984 | 4,079 | 6,032 | 4,693 | 4,600 | 3170 | 2,534 | 2,395 |
| Monthly Avg. | m ³ /day | 83 | 75 | 139 | 81 | 96 | 136 | 195 | 151 | 153 | 102 | 84 | 77 |
| Monthly Max | m ³ /day | 131 | 97.0 | 1,664 | 98 | 142.8 | 183 | 281 | 236 | 176 | 138 | 102 | 114 |

Table 9 – Ballymote Water 2019 Flows

| | | Jan | Feb | March | April | May | June | July | Aug | Sept | Oct. | Nov | Dec |
|---------------|---------------------|-----|-----|-------|-------|-----|------|------|-----|------|------|-----|-----|
| Monthly Total | m ³ | 588 | 467 | 494 | 490 | 535 | 704 | 565 | 152 | 574 | 515 | 511 | 499 |
| Monthly Avg. | m ³ /day | 19 | 17 | 16 | 16 | 17 | 23 | 18 | 5 | 19 | 17 | 17 | 16 |
| Monthly Max | m ³ /day | 30 | 33 | 22 | 28 | 36 | 46 | 47 | 25 | 30 | 21 | 24 | 24 |

Table 10 – Delaware Water 2019 Flows

| | | Jan | Feb | March | April | May | June | July | Aug | Sept | Oct. | Nov | Dec |
|---------------|---------------------|--------|-------|-------|-------|-------|--------|--------|--------|--------|-------|-------|-------|
| Monthly Total | m ³ | 10,276 | 8,195 | 9,825 | 9,231 | 9,745 | 10,923 | 12,491 | 11,793 | 10,106 | 9,469 | 8,832 | 8,935 |
| Monthly Avg. | m ³ /day | 331.5 | 293 | 317 | 308 | 314 | 364 | 403 | 380 | 337 | 305 | 294 | 288 |
| Monthly Max | m ³ /day | 466 | 453 | 471 | 478 | 561 | 520 | 635 | 583 | 417 | 471 | 428 | 390 |

Table 11 – Denfield Water 2019 Flows

| | | Jan | Feb | March | April | May | June | July | Aug | Sept | Oct | Nov | Dec |
|---------------|---------------------|-----|-----|-------|-------|-----|-------|-------|-------|------|-----|-----|-----|
| Monthly Total | m ³ | 882 | 985 | 885 | 972 | 998 | 1,065 | 1,126 | 1,074 | 916 | 970 | 955 | 967 |
| Monthly Avg. | m ³ /day | 28 | 35 | 29 | 32 | 32 | 36 | 36 | 35 | 31 | 31 | 32 | 31 |
| Monthly Max | m ³ /day | 42 | 68 | 37 | 51 | 42 | 55 | 61 | 70 | 44 | 49 | 92 | 43 |

Table 12 – Ilderton Water 2019 Flows

| | | Jan | Feb | March | April | May | June | July | Aug | Sept | Oct | Nov | Dec |
|---------------|---------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Monthly Total | m ³ | 20,932 | 15,165 | 19,767 | 18,487 | 21,435 | 25,081 | 27,042 | 23,957 | 21,744 | 17,930 | 16,596 | 18,509 |
| Monthly Avg. | m ³ /day | 675 | 542 | 638 | 616 | 691 | 836 | 872 | 773 | 725 | 578 | 553 | 597 |
| Monthly Max | m ³ /day | 775 | 1,004 | 766 | 983 | 983 | 1,040 | 1,137 | 1,198 | 982 | 856 | 951 | 719 |

Table 13 – Komoka Water 2019 Flows

| | | Jan | Feb | March | April | May | June | July | Aug | Sept | Oct | Nov | Dec |
|---------------|---------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Monthly Total | m ³ | 25,250 | 24,981 | 25,927 | 23,513 | 27,297 | 31,888 | 38,118 | 34,651 | 32,124 | 26,981 | 23,040 | 28,804 |
| Monthly Avg. | m ³ /day | 815 | 892 | 836 | 784 | 881 | 1,063 | 1,230 | 1,118 | 1,071 | 870 | 768 | 800 |
| Monthly Max | m ³ /day | 1,112 | 1,029 | 1,025 | 942 | 1,187 | 1,387 | 1,423 | 1,393 | 1,398 | 1,098 | 912 | 924 |

Section H – Non-Compliance Findings & Adverse Results

Section 6 documents any known incidents of non-compliance or adverse results and the associated correction actions taken to resolve the issue. 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.

Non-Compliance Findings

The MECP conducted an announced routine inspection of the Middlesex Centre Distribution System on July 4, 2019. The MECP inspector identified one (1) non-compliance with the regulatory requirements.

All microbiological water quality-monitoring requirements for distribution samples were not being met. Ontario Regulation 170/03 – Schedule 10-2 stipulates that distribution water samples are required to be collected for testing every week within the frequency prescribed by Ontario Regulation 170/03 – Schedule 6-1.1 (1). Testing of the samples collected from the distribution system must include E. coli, total coliforms on all samples, and 25% of the required samples must be tested for general bacteria population expressed as colony counts on a heterotrophic plate count. According to the Operating Authority, the Middlesex Centre Distribution system serves a total population of approximately 10,500 people. Given this information, a minimum of 18 microbiological samples are required to be collected for testing each month as prescribed by Ontario Regulation 170/03 – Schedule 10-2. Over the course of the inspection period, the Operating Authority collected an appropriate number of microbiological samples per month with the exception of December 2018 when only 16 samples were collected.

Action(s) Required:

From herein, the Owner / Operating Authority shall ensure that the appropriate number of monthly samples are collected for testing as prescribed by Ontario Regulation 170/03 – Schedule 10-2. Compliance with this requirement will be assessed during the next inspection.

Summary of Reporting Adverse Test Results and Other Problems (Schedule 16)

There were no Adverse Water Quality Indicators (AWQI) during in 2019 reporting period.