Ministry of the Environment, Conservation and Parks

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Ministère de l'Environnement, de la Protection de la nature et des Parcs

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Ontario

August 17, 2021

File no. SI-MI-MC-IL-540

The Municipality of Middlesex Centre
R.R. #2, 10227 Ilderton Road
Ilderton, ON N0M 2A0

Attention: Mr. Eric Joudrey, Manager of Water and Wastewater Operations

Re: Middlesex Centre Distribution System Inspection Report (WW# 260004202)
Inspection conducted on July 22, 2021

Dear Mr. Joudrey,

The enclosed Drinking Water Inspection Report outlines non-compliance, if any, with Ministry legislation, and policies for the above noted water system. Violations noted in this report, if any, have been evaluated based on community risk. These violations will be monitored for compliance with the minimum standards for drinking water in Ontario as set forth under the *Safe Drinking Water Act* and associated regulations. Where risk is deemed to be high and/or compliance is an ongoing concern, violations will be forwarded to this Ministry's Investigation and Enforcement Branch.

In order to measure individual inspection results, the Ministry has established an inspection compliance risk framework based on the principles of the Inspection, Investigation & Enforcement (II&E) Secretariat and advice of internal/external risk experts. The Inspection Summary Rating Record (IRR) provides the Ministry, the system owner and the local Public Health Units with a summarized quantitative measure of the drinking water system's annual inspection and regulated water quality testing performance.

Section 19 of the Safe Drinking Water Act (Standard of Care) creates a number of obligations for individuals who exercise decision-making authority over municipal drinking water systems. Please be aware that the Ministry has encouraged such individuals, particularly municipal councillors, to take steps to be better informed about the drinking water systems over which they have decision-making authority. These steps could include asking for a copy of this inspection report and a review of its findings. Further information about Section 19 can be found in *"Taking Care of Your Drinking Water: A guide for members of municipal council"* found under "Resources" on the Drinking Water Ontario website at www.ontario.ca/drinkingwater.

Please note the attached IRR methodology memo describing how the risk rating model has improved to better reflect the health related and administrative non-compliance found in an inspection report. IRR ratings are published (for the previous inspection year) in the Ministry's Chief Drinking Water Inspector's Annual Report. **Please note that due to a change in IT systems, the Inspection Rating Report (IRR) cannot be generated at the same time as the inspection report. The IRR will be sent separately and prior to any public release (typically within 1-2 month of the completion of the inspection).**

If you have any questions regarding the report, please feel free to call me at (519) 281-2237.

Yours truly,

Neville Rising, P.Eng.
Provincial Officer
London District Office

cc. Middlesex London Health Unit
Upper Thames River Conservation Area
London District File

MIDDLESEX CENTRE DISTRIBUTION SYSTEM (MIDDLESEX CENTRE DS)
171 QUEEN ST, MIDDLESEX CENTRE, ON, N0L 1R0

Inspection Report

System Number:	260004202
Inspection Start Date:	07/15/2021
Inspection End Date:	08/17/2021
Inspected By:	Neville Rising
Badge #:	1039

(signature)

NON-COMPLIANCE/NON-CONFORMANCE ITEMS

The following item(s) have been identified as non-compliance/non-conformance, based on a "No" response captured for a legislative or best management practice (BMP) question (s), respectively.

Question Group: Other Inspection Findings

Question ID	MRDW1116000	
Question	**Question Type**	**Legislative Requirement**
Were the inspection questions sufficient to address other identified best practice issues?	BMP	Not Applicable

Observation/Corrective Action(s)

The following issues were also noted during the inspection:

A. It is unclear if the underground overflow pipes associated with reservoirs and water towers are equipped with screens to mitigate access of invertebrates and other foreign material.

B. According to the documentation provided by the Owner / Operating Authority, there were two occasions when the concentration of free chlorine residual increased significantly during the 24 hour disinfection period of new watermains. On one occasion, the concentration increased from 150 mg/L to 1000 mg/L through the 24 disinfection period, and on another occasion, the concentration increased from 350 mg/L to 1660 mg/L through the 24 disinfection period.

Corrective Actions:
A. It is recommended that the Owner / Operating Authority assess the underground overflow pipes associated with reservoirs and water towers to determine if appropriate screens are present to mitigate access of invertebrates and other foreign material.

B. It is recommended that the Owner / Operating Authority assess the method in which the free chlorine concentration is measured or the method in which the batch of chlorinated water is prepared given the variability of the free chlorine measurements over the length of the new watermains during the disinfection period.

Question Group: Security

Question ID	MRDW1071000	
Question	**Question Type**	**Legislative Requirement**

Has the owner provided security measures to protect components of the drinking water system?	BMP	Not Applicable

Observation/Corrective Action(s)

The owner had not provided security measures to protect components of the drinking water system.

The Plants and Water Towers associated with the water system remain locked at all times and are equipped with entry alarms which are connected to a dialing system to alert the Operating Authority / Owner of unathourized entry. Several of the components are enclosed within locked security fencing. Most components associated with the water system are visited on a daily basis, or at least three times per week.

According to the Operating Authority, security of the SCADA system is based solely from their Internet provider.

Corrective Actions:
It is recommended that the Owner / Operating Authority assess the current state of their cybersecurity to protect the confidentiality and integrity of transmitted information and deter identity theft by outside attackers as referenced in the 2012 Edition of the Recommended Standards for Waterworks

INSPECTION DETAILS

This section includes all questions that were assessed during the inspection.

Ministry Program: Regulated Activity: DRINKING WATER : DW Municipal Residential

Question ID	MRDW1001000	
Question	**Question Type**	**Legislative Requirement**
What was the scope of this inspection?	Information	Not Applicable

Observation

The primary focus of this inspection is to confirm compliance with Ministry of the Environment, Conservation and Parks (MECP) legislation as well as evaluating conformance with ministry drinking water policies and guidelines during the inspection period. The ministry utilizes a comprehensive, multi-barrier approach in the inspection of water systems that focuses on the source, treatment, and distribution components as well as management practices.

This drinking water system is subject to the legislative requirements of the Safe Drinking Water Act, 2002 (SDWA) and regulations made therein, including Ontario Regulation 170/03, "Drinking Water Systems" (O.Reg. 170/03). This inspection has been conducted pursuant to Section 81 of the SDWA.

This inspection report does not suggest that all applicable legislation and regulations were evaluated. It remains the responsibility of the owner to ensure compliance with all applicable legislative and regulatory requirements.

As part of the inspection, several documents were reviewed to support the conclusions and inferences presented within this report. Generally, these include but are not limited to:

1. Middlesex Centre Water System Operations and Maintenance Manuals
2. Drinking Water Works Permit #052-201, Issue #4 dated June 30, 2016
3. Municipal Drinking Water License #052-101, Issue #4 dated October 26, 2017
4. Municipal Drinking Water License #052-101, Issue #5 dated April 23, 2021

Other documents reviewed include microbiological and chemical testing results, logsheets, etc. It should be noted that this inspection covers the period from July 1, 2020 to June 30, 2021.

The communities of Ilderton and Denfield receive water from a water main from the Lake Huron Treatment Plant. Kilworth / Komoka and Delaware receive water from a pipeline extending from the Arva Reservoir. Arva and Ballymote can receive water from the Arva reservoir and/or the City of London.

The physical inspection was conducted on July 22, 2021 and included a site visit to the components noted in the Drinking Water Works Permit.

Question ID	MRDW1000000		
Question		**Question Type**	**Legislative Requirement**
Does this drinking water system provide primary disinfection?		Information	Not Applicable
Observation			
This Drinking Water System provides for only secondary disinfection and distribution of water. Primary disinfection is undertaken by another regulated Drinking Water System which provides treated water to this Drinking Water System. The distribution system receives water from other water systems where primary disinfection has occurred.			

Question ID	MRDW1033000		
Question		**Question Type**	**Legislative Requirement**
Is the secondary disinfectant residual measured as required for the large municipal residential distribution system?		Legislative	SDWA | O. Reg. 170/03 | 7-2 | (3), SDWA | O. Reg. 170/03 | 7-2 | (4)
Observation			
The secondary disinfectant residual was measured as required for the distribution system. The Middlesex Centre Distribution system is equipped with online chlorine analysers at each of its major components including Ballymote, Arva, Denfield, Ilderton, Komoka and Delaware. At locations including Ballymote and Arva, the Operating Authority does not add sodium hypochlorite to the water, and as such, the online meters at this location are interpreted to be regulatory meters. In addition, the Operating Authority also uses a portable chlorine analyzer to measure the concentration of free chlorine at various locations throughout the distribution system. The number of samples collected with the portable chlorine analyzer is also sufficient to satisfy the requirements of Ontario Regulation 170/03 – Schedule 7 2.			

Question ID	MRDW1037000		
Question		**Question Type**	**Legislative Requirement**
Are all continuous monitoring equipment utilized for sampling and testing required by O. Reg.170/03, or MDWL or DWWP or order, equipped with alarms or shut-off mechanisms that satisfy the standards described in Schedule 6?		Legislative	SDWA | O. Reg. 170/03 | 6-5 | (1) 1-4,SDWA | O. Reg. 170/03 | 6-5 | (1)5-10,SDWA | O. Reg. 170/03 | 6-5 | (1.1)

Observation
All continuous monitoring equipment utilized for sampling and testing required by O. Reg.170/03, or Municipal Drinking Water Licence or Drinking Water Works Permit or order, were equipped with alarms or shut-off mechanisms that satisfy the standards described in Schedule 6. According to discussions with the Operating Authority, alarms and automatic shut off mechanisms are engaged within the Treatment Plant in the event of unusual activities. The following range of alarm settings are programmed in the SCADA system, however, they are subject to change based on operating conditions: Ilderton: 1. Low Alarm = 0.5 mg/L 2. High Alarm = 3.0 mg/L Denfield: 1. Low Alarm = 0.5 mg/L 2. High Alarm = 3.0 mg/L Komoka: 1. Low Alarm = 0.9 mg/L 2. High Alarm = 2.5 mg/L Delaware: 1. Low Alarm = 0.5 mg/L 2. High Alarm = 2.0 mg/L Arva: 1. Low Alarm = 0.5 mg/L 2. High Alarm = 3.0 mg/L Ballymote: 1. Low Alarm = 0.3 mg/L 2. High Alarm = 3.0mg/L There are additional alarms including no chlorine flow, communication loss, etc. which aid in the operation of the water system.

Question ID	MRDW1038000	
Question	**Question Type**	**Legislative Requirement**
Is continuous monitoring equipment that is being utilized to fulfill O. Reg. 170/03 requirements performing tests for the parameters with at least the minimum frequency specified in the Table in Schedule 6 of O. Reg. 170/03 and recording data with the prescribed format?	Legislative	SDWA | O. Reg. 170/03 | 6-5 | (1) 1-4
Observation		

Continuous monitoring equipment that was being utilized to fulfill O. Reg. 170/03 requirements was performing tests for the parameters with at least the minimum frequency specified in the Table in Schedule 6 of O. Reg. 170/03 and recording data with the prescribed format.

The online analyzers used to measure the concentration of free chlorine in the distribution system provide readings every minute to coincide with the polling frequency of the equipment and SCADA system. There was infrequent short gaps in the online data from these meters associated with power blips, calibrations, and maintenance.

Question ID	MRDW1035000	
Question	**Question Type**	**Legislative Requirement**
Are operators examining continuous monitoring test results and are they examining the results within 72 hours of the test?	Legislative	SDWA | O. Reg. 170/03 | 6-5 | (1) 1-4,SDWA | O. Reg. 170/03 | 6-5 | (1)5-10

Observation

Operators were examining continuous monitoring test results and they were examining the results within 72 hours of the test.

The Operating Authority typically reviews the online data on a daily basis by way of the SCADA system.

Question ID	MRDW1040000	
Question	**Question Type**	**Legislative Requirement**
Are all continuous analysers calibrated, maintained, and operated, in accordance with the manufacturer's instructions or the regulation?	Legislative	SDWA | O. Reg. 170/03 | 6-5 | (1) 1-4,SDWA | O. Reg. 170/03 | 6-5 | (1)5-10

Observation

All continuous analysers were calibrated, maintained, and operated, in accordance with the manufacturer's instructions or the regulation.

The Owner / Operating Authority indicated that the portable chlorine analyzers used at the Middlesex Centre Treatment Plants are calibrated on an annual basis by an outside contractor and were last calibrated in October 2019 and September 2020. The Operating Authority advised that the online continuous analyzers are calibrated / verified against the hand held portable meters on a daily basis. This information was also presented on the systems logsheets. Lastly, the Operating Authority conducts monthly checks of the portable chlorine meters against verification standards to ensure the accuracy of these meters is maintained.

Question ID	MRDW1108000		
Question		**Question Type**	**Legislative Requirement**
Where continuous monitoring equipment used for the monitoring of free chlorine residual, total chlorine residual, combined chlorine residual or turbidity, required by Regulation 170, an Order, MDWL, or DWWP issued under Part V, SDWA, has triggered an alarm or an automatic shut-off, did a qualified person respond in a timely manner and take appropriate actions?		Legislative	SDWA | O. Reg. 170/03 | 6-5 | (1) 1-4,SDWA | O. Reg. 170/03 | 6-5 | (1)5-10,SDWA | O. Reg. 170/03 | 6-5 | (1.1)
Observation			
Where required continuous monitoring equipment used for the monitoring of chlorine residual and/or turbidity triggered an alarm or an automatic shut-off, a qualified person responded in a timely manner and took appropriate actions. The Owner /Operating Authority advised that they respond to alarms immediately upon notification.			

Question ID	MRDW1018000		
Question		**Question Type**	**Legislative Requirement**
Has the owner ensured that all equipment is installed in accordance with Schedule A and Schedule C of the Drinking Water Works Permit?		Legislative	SDWA | 31 | (1)
Observation			
The owner had ensured that all equipment was installed in accordance with Schedule A and Schedule C of the Drinking Water Works Permit. Generally stated, at the time of the site inspection, all equipment referenced in the Drinking Water Works Permit ("DWWP") was present at each of the listed component sites. It should be noted however, that the new Delaware Standpipe is not referenced on the current DWWP, but it is expected to be present on the next issue of the permit as a Director's Notification form was completed for this component.			

Question ID	MRDW1020000		
Question		**Question Type**	**Legislative Requirement**
Is the owner/operating authority able to demonstrate that, when required during the inspection period, Form 1 documents were prepared in accordance with their Drinking Water Works Permit?		Legislative	SDWA | 31 | (1)
Observation			
The owner/operating authority was in compliance with the requirement to prepare Form 1 documents as required by their Drinking Water Works Permit during the inspection period.			

Over the course of the inspection period, the Owner / Operating Authority provided one Form 1 document related to the installation of a watermain on Martin Road.

Question ID	MRDW1021000	
Question	**Question Type**	**Legislative Requirement**
Is the owner/operating authority able to demonstrate that, when required during the inspection period, Form 2 documents were prepared in accordance with their Drinking Water Works Permit?	Legislative	SDWA | 31 | (1)

Observation

The owner/operating authority was in compliance with the requirement to prepare Form 2 documents as required by their Drinking Water Works Permit during the inspection period.

Over the course of the inspection period, the Owner / Operating Authority provided five Form 2 documents related to:

1. Replacement of UPS units at Ballymote,
2. Replacement of chemical metering pump at Komoka Booster Station and switched out again for the original pump once repaired.
3. Replacement of chemical metering pump at Delaware Rechlorination Facililty
4. Installed a 1 inch air / vacuum on the distribution header at the Ilderton BPS

Question ID	MRDW1024000	
Question	**Question Type**	**Legislative Requirement**
Do records confirm that the water treatment equipment which provides chlorination or chloramination for secondary disinfection purposes was operated so that at all times and all locations in the distribution system the chlorine residual was never less than 0.05 mg/l free or 0.25 mg/l combined?	Legislative	SDWA | O. Reg. 170/03 | 1-2 | (2)

Observation

Records confirmed that the water treatment equipment which provides chlorination or chloramination for secondary disinfection purposes was operated so that at all times and all locations in the distribution system the chlorine residual was never less than 0.05 mg/l free or 0.25 mg/l combined.

The Middlesex Centre Distribution System is equipped with permanent rechlorination systems at the Ilderton, Arva, Delaware, Kilworth / Komoka and Denfield components of the drinking water system. In addition, the Ballymote panel can be connected to a portable rechlorination system if needed. The Owner / Operating Authority records continuous free chlorine residual readings at each of the aforementioned locations, in addition to taking manual grab samples from the Middlesex Centre Distribution System. According to the manual grab samples collected, there were no events when the concentration of free chlorine was less than 0.05 mg/L. According to the online continuous chlorine data provided for review, there were occasions when the free chlorine

was reported at concentrations of less than 0.05 mg/L for certain periods of time. However, the Operating Authority provided specific acceptable reasons for these occurrences such as power outages, equipment calibration, etc. Similarly, there were a few occasions when the concentration of chlorine spiked above 4 mg/L for periods of time due to pump start ups, calibrations, etc, however, these readings quickly adjusted to representative readings thereafter.

Question ID	MRDW1025000	
Question	**Question Type**	**Legislative Requirement**
Were all parts of the drinking water system that came in contact with drinking water (added, modified, replaced or extended) disinfected in accordance with a procedure listed in Schedule B of the Drinking Water Works Permit?	Legislative	SDWA | 31 | (1)

Observation

All parts of the drinking water system were disinfected in accordance with a procedure listed in Schedule B of the Drinking Water Works Permit.

Drinking Water Works Permit #052-201 - Section 2.3 stipulates minimum requirements related to disinfection of parts associated with the drinking water system. Generally stated, all parts of the drinking water system that come in contact with the drinking water shall be disinfected in according with a procedure approved by the Director or in or in accordance with the applicable provisions of the following documents:

a) The ministry's Watermain Disinfection Procedure, effective December 30, 2016;
b) AWWA C652 – Standard for Disinfection of Water-Storage Facilities;
c) AWWA C653 – Standard for Disinfection of Water
d) AWWA C654 – Standard for Disinfection of Wells.

As part of this inspection the Owner / Operating Authority provided multiple documents related to repair work, service connections and watermain connections. Generally stated, the work completed was compliant with the requirements prescribed by Section 2.3 of Drinking Water Works Permit #052-201, including the Watermain Disinfection Procedure and the appropriate AWWA standards

Question ID	MRDW1062000	
Question	**Question Type**	**Legislative Requirement**
Do records or other record keeping mechanisms confirm that operational testing not performed by continuous monitoring equipment is being done by a certified operator, water quality analyst, or person who meets the requirements of O. Reg. 170/03 7-5?	Legislative	SDWA | O. Reg. 170/03 | 7-5

Observation

Records or other record keeping mechanisms confirmed that operational testing not performed by continuous monitoring equipment was being done by a certified operator, water quality analyst, or

person who suffices the requirements of O. Reg. 170/03 7-5.

Question ID	MRDW1060000		
Question		**Question Type**	**Legislative Requirement**
Do the operations and maintenance manuals meet the requirements of the DWWP and MDWL issued under Part V of the SDWA?		Legislative	SDWA | 31 | (1)

Observation

The operations and maintenance manuals met the requirements of the Drinking Water Works Permit and Municipal Drinking Water Licence issued under Part V of the SDWA.

The Owner / Operating Authority are reminded that the manual must contain, at a minimum, the elements prescribed by Section 16.2 of Municipal Drinking Water Licence #052-101 - Issue #5.

Question ID	MRDW1071000		
Question		**Question Type**	**Legislative Requirement**
Has the owner provided security measures to protect components of the drinking water system?		BMP	Not Applicable

Observation

The owner had not provided security measures to protect components of the drinking water system.

The Plants and Water Towers associated with the water system remain locked at all times and are equipped with entry alarms which are connected to a dialing system to alert the Operating Authority / Owner of unathourized entry. Several of the components are enclosed within locked security fencing. Most components associated with the water system are visited on a daily basis, or at least three times per week.

According to the Operating Authority, security of the SCADA system is based solely from their Internet provider.

Corrective Actions:
It is recommended that the Owner / Operating Authority assess the current state of their cybersecurity to protect the confidentiality and integrity of transmitted information and deter identity theft by outside attackers as referenced in the 2012 Edition of the Recommended Standards for Waterworks

Question ID	MRDW1073000		
Question		**Question Type**	**Legislative Requirement**
Has the overall responsible operator been designated for all		Legislative	SDWA | O. Reg.

subsystems which comprise the drinking water system?		128/04 | 23 | (1)
Observation		
The overall responsible operator has been designated for each subsystem. Middlesex Centre currently has one person designated as the Overall Responsible Operator for this water system. However, there are additional Operators adequately certified to act in the role of Overall Responsible Operator in the event of absences. The water system is classified as a Class 2 Water Distribution System (September 18, 2017, #6745).		

Question ID	MRDW1074000	
Question	**Question Type**	**Legislative Requirement**
Have operators in charge been designated for all subsystems for which comprise the drinking water system?	Legislative	SDWA | O. Reg. 128/04 | 25 | (1)
Observation		
Operators-in-charge had been designated for all subsystems which comprised the drinking water system.		

Question ID	MRDW1075000	
Question	**Question Type**	**Legislative Requirement**
Do all operators possess the required certification?	Legislative	SDWA | O. Reg. 128/04 | 22
Observation		
All operators possessed the required certification.		

Question ID	MRDW1076000	
Question	**Question Type**	**Legislative Requirement**
Do only certified operators make adjustments to the treatment equipment?	Legislative	SDWA | O. Reg. 170/03 | 1-2 | (2)
Observation		
Only certified operators made adjustments to the treatment equipment.		

Question ID	MRDW1099000	
Question	**Question Type**	**Legislative Requirement**
Do records show that all water sample results taken during the inspection review period did not exceed the values of tables 1, 2 and 3 of the Ontario Drinking Water Quality Standards (O. Reg.. 169/03)?	Information	Not Applicable
Observation		

Records did not show that all water sample results taken during the inspection review period did not exceed the values of tables 1, 2 and 3 of the Ontario Drinking Water Quality Standards (O. Reg. 169/03).

Over the course of the inspection period, there was one adverse water quality incident ("AWQI") as described below:

1. AWQI # 150984 – Total Coliform = 7 CFU/100 mL

Question ID	MRDW1094000	
Question	**Question Type**	**Legislative Requirement**
Are all water quality monitoring requirements imposed by the MDWL and DWWP being met?	Legislative	SDWA | 31 | (1)

Observation

All water quality monitoring requirements imposed by the MDWL or DWWP issued under Part V of the SDWA were being met.

Municipal Drinking Water License #052-101, Issues #4 and #5, Schedule D prescribe relief from regulatory lead sampling as prescribed by Ontario Regulation 170/03 - Schedule 15.1, however, the requirements presented within the MDWL expired on October 15, 2018.

Over the course of the inspection period, there were two sampling periods for lead including:

1. June 15, 2020 to Oct 15, 2020
2. Dec 15, 2020 to Apr 15, 2021

Throughout these two sampling periods, the Owner / Operating Authority applied for and received Temporary Pandemic Relief approvals for the collection and testing of lead samples as described below:

Temporary Relief Approval #316-M-052-101 – June 15, 2020 to October 15, 2020
a. 0 Private Residential Lead samples
b. 2 Non-Private Residential Lead samples
c. 4 Distribution Lead samples

Temporary Relief Approval #379-M-052-101 – December 15, 2020 to April 15, 2021
a. 0 Private Residential Lead samples
b. 2 Non-Private Residential Lead samples
c. 4 Distribution Lead samples

The following samples were collected for testing:

Sampling Period - June 15, 2020 to Oct 15, 2020

a. 0 Private Residential Lead samples
b. 4 Non-Private Residential Lead samples – Lead, Lead and pH
c. 8 Distribution Lead samples – Lead, pH and Alkalinity

Sampling Period - Dec 15, 2020 to Apr 15, 2021
a. 0 Private Residential Lead samples
b. 2 Non-Private Residential Lead samples – Lead, Lead and pH
c. 4 Distribution Lead samples – Lead, pH and Alkalinity

Based on the aforementioned testing, the Owner / Operating Authority met with the lead sampling and testing requirements prescribed by both Temporary Relief Approvals #316-M-052-101 and #379-M-052-101.

Question ID	MRDW1096000	
Question	**Question Type**	**Legislative Requirement**
Do records confirm that chlorine residual tests are being conducted at the same time and at the same location that microbiological samples are obtained?	Legislative	SDWA | O. Reg. 170/03 | 6-3 | (1)
Observation		
Records confirmed that chlorine residual tests were being conducted at the same time and at the same location that microbiological samples were obtained.		

Question ID	MRDW1081000	
Question	**Question Type**	**Legislative Requirement**
Are all microbiological water quality monitoring requirements for distribution samples being met?	Legislative	SDWA | O. Reg. 170/03 | 10-2 | (1),SDWA | O. Reg. 170/03 | 10-2 | (2),SDWA | O. Reg. 170/03 | 10-2 | (3)
Observation		
All microbiological water quality monitoring requirements for distribution samples were 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 10500 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.

Question ID	MRDW1086000	
Question	**Question Type**	**Legislative Requirement**
Are all haloacetic acid water quality monitoring requirements prescribed by legislation conducted within the required frequency and at the required location?	Legislative	SDWA | O. Reg. 170/03 | 13-6.1 | (1),SDWA | O. Reg. 170/03 | 13-6.1 | (2),SDWA | O. Reg. 170/03 | 13-6.1 | (3), SDWA | O. Reg. 170/03 | 13-6.1 | (4),SDWA | O. Reg. 170/03 | 13-6.1 | (5),SDWA | O. Reg. 170/03 | 13-6.1 | (6)

Observation

All haloacetic acid water quality monitoring requirements prescribed by legislation are being conducted within the required frequency and at the required location.

Ontario Regulation 170/03 – Schedule 13-6.1 stipulates that haloacetic acids are required to be collected and tested every three months from the distribution water within the required frequency as prescribed by Ontario Regulation 170/03 – Schedule 6-1.1(4). The requirement for collecting and analyzing haloacetic acids became effective on January 1, 2017. According to documentation provided for review from the Owner / Operating Authority, samples were collected on the following days from the distribution system:

1. April 6, 2020 – HAA = 17.5 ug/L
2. July 6, 2021 – HAA = 15.9 ug/L
3. October 5, 2021 – HAA = 19.9 ug/L
4. January 4, 2021 – HAA = 13.9 ug/L
5. April 5, 2021 – HAA = 15.9 ug/L

Based on the aforementioned tests, the Owner / Operating Authority are in compliance with the requirements for collecting haloacetic acids water quality samples as prescribed on Ontario Regulation 170/03 – Schedule 13-6.1.

The Owner / Operating Authority is reminded that assessment of the reported results for

haloacetic acids is based on a running annual average of quarterly results and calculated as prescribed by Ontario Regulation 170/03 – Schedule 13-6.1 (3) as follows:

"(3) For the purposes of Schedule 2 to the Ontario Drinking Water Quality Standards, the running annual average of quarterly results with respect to haloacetic acids shall be calculated for each calendar quarter by using the following formula:

[A + B + C + D] ÷ 4

in which,
"A" is the average of all the results from the samples tested under subsection (2) in that calendar quarter,
"B" is the average of all the results from the samples tested under subsection (2) in the most recent calendar quarter preceding the calendar quarter referred to in "A" in which testing was carried out,
"C" is the average of all the results from the samples tested under subsection (2) in the most recent calendar quarter preceding the calendar quarter referred to in "B" in which testing was carried out, and
"D" is the average of all the results from the samples tested under subsection (2) in the most recent calendar quarter preceding the calendar quarter referred to in "C" in which testing was carried out."

A running annual average for each quarter must be calculated and recorded to ensure compliance has been met after each quarter.

Question ID	MRDW1087000	
Question	**Question Type**	**Legislative Requirement**
Have all trihalomethane water quality monitoring requirements prescribed by legislation been conducted within the required frequency and at the required location?	Legislative	SDWA | O. Reg. 170/03 | 13-6 | (1)

Observation

All trihalomethane water quality monitoring requirements prescribed by legislation were conducted within the required frequency and at the required location.

Ontario Regulation 170/03 - Schedule 13-6 stipulates that trihalomethanes are required to be collected and tested every three months from the distribution water within the required frequency as prescribed by Ontario Regulation 170/03 - Schedule 6-1.1(4). Over the course of the inspection period, the following samples were collected from the distribution system.

1. April 6, 2020 - THM = 29 ug/L
2. July 6, 2021 – THM = 29 ug/L
3. October 5, 2021 – THM = 36 ug/L
4. January 4, 2021 – THM = 25 ug/L
5. April 5, 2021 – THM = 28 ug/L

Based on the aforementioned tests, the Owner / Operating Authority are in compliance with the

requirements for collecting trihalomethane water quality samples as prescribed by Ontario Regulation 170/03 - Schedule 13-6.

Question ID	MRDW1100000	
Question	**Question Type**	**Legislative Requirement**
Did any reportable adverse/exceedance conditions occur during the inspection period?	Information	Not Applicable
Observation		
There were reportable adverse/exceedances during the inpsection period. Over the course of the inspection period, there was one adverse water quality incident ("AWQI") as described below: 1. AWQI # 150984 – Total Coliform = 7 CFU/100 mL		

Question ID	MRDW1101000	
Question	**Question Type**	**Legislative Requirement**
Have corrective actions (as per Schedule 17) been taken to address adverse conditions, including any other steps as directed by the Medical Officer of Health?	Legislative	SDWA | O. Reg. 170/03 | 17-1, SDWA | O. Reg. 170/03 | 17-10 | (1),SDWA | O. Reg. 170/03 | 17-10 | (2),SDWA | O. Reg. 170/03 | 17-11,SDWA | O. Reg. 170/03 | 17-12,SDWA | O. Reg. 170/03 | 17-13,SDWA | O. Reg. 170/03 | 17-14,SDWA | O. Reg. 170/03 | 17-2,SDWA | O. Reg. 170/03 | 17-3,SDWA | O. Reg. 170/03 | 17-4,SDWA | O. Reg. 170/03 | 17-5,SDWA | O. Reg. 170/03 | 17-6,SDWA | O. Reg. 170/03 | 17-

		9

Observation

Corrective actions (as per Schedule 17) had been taken to address adverse conditions, including any other steps that were directed by the Medical Officer of Health.

Over the course of the inspection period, there was one adverse water quality incident ("AWQI") as described below:

1. AWQI # 150984 – Total Coliform = 7 CFU/100 mL

During this event, the appropriate corrective actions were completed and the Spills Action Centre and the Medical Officer of Health (i.e. Health Unit) were contacted.

Question ID	MRDW1113000	
Question	**Question Type**	**Legislative Requirement**
Have all changes to the system registration information been provided to the Ministry within ten (10) days of the change?	Legislative	SDWA | O. Reg. 170/03 | 10.1 | (3)

Observation

All changes to the system registration information were provided within ten (10) days of the change.

Ontario Regulation 170/3 – Section 10.1(3) stipulates that the Director must be notified of any changes to the drinking water system profile information within 10 days of the aforementioned modification. At the time of the site visit, the information presented in the profile was considered to be accurate.

Question ID	MRDW1104000	
Question	**Question Type**	**Legislative Requirement**
Were all required verbal notifications of adverse water quality incidents immediately provided as per O. Reg. 170/03 16-6?	Legislative	SDWA | O. Reg. 170/03 | 16-6 | (1),SDWA | O. Reg. 170/03 | 16-6 | (2),SDWA | O. Reg. 170/03 | 16-6 | (3),SDWA | O. Reg. 170/03 | 16-6 | (3.1),SDWA | O. Reg. 170/03 | 16-6 | (3.2), SDWA | O. Reg. 170/03 | 16-6 | (4),SDWA | O. Reg. 170/03 | 16-

		6 | (5),SDWA | O. Reg. 170/03 | 16-6 | (6)

Observation

All required notifications of adverse water quality incidents were immediately provided as per O. Reg. 170/03 16-6.

Question ID	MRDW1114000	
Question	**Question Type**	**Legislative Requirement**
Does the owner have evidence that, when required, all legal owners associated with the DWS were notified of the requirements of the Licence & Permit?	Legislative	SDWA | 31 | (1)

Observation

The owner had evidence that all required notifications to all legal owners associated with the Drinking Water System had been made during the inspection period.

The Owners are made aware of the requirements of the Licence and Permit through the acceptance of the Annual / Summary Report through council resolution. In addition, the Owner / Operating Authority advised that the Councillors have just recently received Standard of Care training associated with water systems.

Question ID	MRDW1116000	
Question	**Question Type**	**Legislative Requirement**
Were the inspection questions sufficient to address other identified best practice issues?	BMP	Not Applicable

Observation

The following issues were also noted during the inspection:

A. It is unclear if the underground overflow pipes associated with reservoirs and water towers are equipped with screens to mitigate access of invertebrates and other foreign material.

B. According to the documentation provided by the Owner / Operating Authority, there were two occasions when the concentration of free chlorine residual increased significantly during the 24 hour disinfection period of new watermains. On one occasion, the concentration increased from 150 mg/L to 1000 mg/L through the 24 disinfection period, and on another occasion, the concentration increased from 350 mg/L to 1660 mg/L through the 24 disinfection period.

Corrective Actions:
A. It is recommended that the Owner / Operating Authority assess the underground overflow pipes associated with reservoirs and water towers to determine if appropriate screens are present

to mitigate access of invertebrates and other foreign material.

B. It is recommended that the Owner / Operating Authority assess the method in which the free chlorine concentration is measured or the method in which the batch of chlorinated water is prepared given the variability of the free chlorine measurements over the length of the new watermains during the disinfection period.

Question ID	MRDW1059000	
Question	**Question Type**	**Legislative Requirement**
Do the operations and maintenance manuals contain plans, drawings and process descriptions sufficient for the safe and efficient operation of the system?	Legislative	SDWA | O. Reg. 128/04 | 28

Observation

The operations and maintenance manuals contained plans, drawings and process descriptions sufficient for the safe and efficient operation of the system.

The Owner / Operating Authority provided individual Operations and Maintenance Manuals for each of the components of the drinking water system. These manuals included the following:

1. Denfield Booster Pumping Station – Operations and Maintenance Manual (4 July 2019)
2. Ilderton BPS and Elevated Water Tower – Operations and Maintenance Manual (4 July 2019)
3. Komoka Booster Pumping Station and Intermediate Pumping Station – Operations and Maintenance Manual (4 July 2019)
4. Ballymote Operations and Maintenance Manual (7 June 2021)
5. Arva Water Distribution Operations and Maintenance Manual (7 June 2021)
6. Delaware Re-Chlorination Facility Operations and Maintenance Manual (7 June 2021)

Generally stated, the Operations and Maintenance Manuals are specific to each component, but offer some overlapping information. In addition to the manuals noted above, there are individual Emergency Response Plans (Contingency Plans) for each of the components.

Question ID	MRDW1061000	
Question	**Question Type**	**Legislative Requirement**
Are logbooks properly maintained and contain the required information?	Legislative	SDWA | O. Reg. 128/04 | 27 | (1), SDWA | O. Reg. 128/04 | 27 | (2), SDWA | O. Reg. 128/04 | 27 | (3), SDWA | O. Reg.

		128/04 | 27 | (4), SDWA | O. Reg. 128/04 | 27 | (5), SDWA | O. Reg. 128/04 | 27 | (6), SDWA | O. Reg. 128/04 | 27 | (7)

Observation

Logbooks were properly maintained and contained the required information.

The logbooks identify the ORO and the OIC for the day. In addition, the time at which the Operator conducted their duties, and the duties and checks performed were recorded within the logbooks. The Operating Authority also completed daily logsheets of standard activities including but not limited to: pump run time, raw and treated water flow, chlorine residual and chlorine tank level.

The system is equipped with a paperless recorder to log the data from the online meters. This information is reviewed on a daily basis, and Middlesex Centre utilizes an ERIS Reporting system which provides summaries of the online data on which the Operators can sign off on their review of the data and add comments in the event of any usual readings.

Stakeholder References

Key Reference and Guidance Material for Municipal Residential Drinking Water Systems

Many useful materials are available to help you operate your drinking water system. Below is a list of key materials owners and operators of municipal residential drinking water systems frequently use.

To access these materials online click on their titles in the table below or use your web browser to search for their titles. Contact the Ministry if you need assistance or have questions at 1-866-793-2588 or waterforms@ontario.ca.

For more information on Ontario's drinking water visit www.ontario.ca/drinkingwater

PUBLICATION TITLE	PUBLICATION NUMBER
FORMS: Drinking Water System Profile Information Laboratory Services Notification Adverse Test Result Notification	 012-2149E 012-2148E 012-4444E
Taking Care of Your Drinking Water: A Guide for Members of Municipal Councils	Website
Procedure for Disinfection of Drinking Water in Ontario	Website
Strategies for Minimizing the Disinfection Products Trihalomethanes and Haloacetic Acids	Website
Filtration Processes Technical Bulletin	Website
Ultraviolet Disinfection Technical Bulletin	Website
Guide for Applying for Drinking Water Works Permit Amendments, & License Amendments	Website
Certification Guide for Operators and Water Quality Analysts	Website
Guide to Drinking Water Operator Training Requirements	9802E
Community Sampling and Testing for Lead: Standard and Reduced Sampling and Eligibility for Exemption	Website
Drinking Water System Contact List	7128E01
Ontario's Drinking Water Quality Management Standard - Pocket Guide	Website
Watermain Disinfection Procedure	Website
List of Licensed Laboratories	Website

Ontario

Principaux guides et documents de référence sur les réseaux résidentiels municipaux d'eau potable

De nombreux documents utiles peuvent vous aider à exploiter votre réseau d'eau potable. Vous trouverez ci-après une liste de documents que les propriétaires et exploitants de réseaux résidentiels municipaux d'eau potable utilisent fréquemment. Pour accéder à ces documents en ligne, cliquez sur leur titre dans le tableau ci-dessous ou faites une recherche à l'aide de votre navigateur Web. Communiquez avec le ministère au 1-866-793-2588, ou encore à waterforms@ontario.ca si vous avez des questions ou besoin d'aide.

Pour plus de renseignements sur l'eau potable en Ontario, consultez le site www.ontario.ca/eaupotable

TITRE DE LA PUBLICATION	NUMÉRO DE PUBLICATION
Renseignements sur le profil du réseau d'eau potable Avis de demande de services de laboratoire Avis de résultats d'analyse insatisfaisants et de règlement des problèmes	012-2149F 012-2148F 012-4444F
Prendre soin de votre eau potable - Un guide destiné aux membres des conseils municipaux	Site Web
Marche à suivre pour désinfecter l'eau portable en Ontario	Site Web
Stratégies pour minimiser les trihalométhanes et les acides haloacétiques de sous-produits de désinfection	Site Web
Filtration Processes Technical Bulletin (en anglais seulement)	Site Web
Ultraviolet Disinfection Technical Bulletin (en anglais seulement)	Site Web
Guide de présentation d'une demande de modification du permis d'aménagement de station de production d'eau potable	Site Web
Guide sur l'accréditation des exploitants de réseaux d'eau potable et des analystes de la qualité de l'eau de réseaux d'eau potable	Site Web
Guide sur les exigences relatives à la formation des exploitants de réseaux d'eau potable	9802F
Échantillonnage et analyse du plomb dans les collectivités : échantillonnage normalisé ou réduit et admissibilité à l'exemption	Site Web
Liste des personnes-ressources du réseau d'eau potable	Site Web
L'eau potable en Ontario - Norme de gestion de la qualité - Guide de poche	Site Web
Procédure de désinfection des conduites principales	Site Web
Laboratoires autorisés	Site Web

Ontario

DWS Component Information

DWS Component Information Report for 260004202

as of 16-AUG-2021

Drinking Water System Profile Information

DWS #	260004202
MOE Assigned Name	Middlesex Centre Distribution System - Middlesex Centre Ds
Category	LMRS
Regulation	O.REG 170/03
DWS Type	Distribution System
Source Type	Distribution
Address	171 Queen Street, Komoka, Ontario, N0L 1R0, Canada
Region	Southwestern Region
District	London District
Municipality	Middlesex Centre
Public Health Unit	Middlesex-London Health Unit

LWIS Component Name	LWIS Component Type	LWIS Component Sub-Type	Component Address	Block
Denfield Reservoir Booster / Rechlorination Station	Other	Booster Station	Lot 28, Conc. 15 Denfield Road,	The Denfield Reservoir Booster Station is connected to the Lake Huron Water Supply System (Waterworks #210000791) via a 1200 mm pipeline. The Booster Station is located on the eastern side of Denfield Road, approximately 200 metres north of Fifteen Mile Road and just south of the Village of Denfield. Generally stated, water from the Lake Huron pipeline is conveyed into the Denfield Reservoir Booster Station where chlorine can be added if required to increase the concentration of free chlorine prior to the water being conveyed into the Denfield reservoir. Water from the reservoir is subsequently conveyed back into the Denfield

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as of 16-AUG-2021

LWIS Component Name	LWIS Component Type	LWIS Component Sub-Type	Component Address	Block
				Reservoir Booster Station where additional chlorine can be added to the system if required prior to its delivery to the Denfield Distribution system. There are a total of three booster pumps and three hydropneumatic pressure tanks to maintain adequate pressure in the distribution system, and there are a total of three free chlorine analyzers within the Denfield Reservoir Booster Station which are connected to the online SCADA system to monitor the concentration of free chlorine throughout the process train. The liquid chlorine is located within a designated room in the western part of the main building which is also equipped with secondary containment. The station is equipped with a quick-connect for a portable generator in the event of a power failure . Location: 23856 Denfield Rd UTM Coordinates: NAD 27: UTM Zone 17:

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LWIS Component Name	LWIS Component Type	LWIS Component Sub-Type	Component Address	Block
				465050.00 m E., 4774710.00 m N Equipment: A 130 m3 on ground storage tank; Two (2) fixed speed pumps rated at 3.8 L/s at 42.2 m TDH and One (1) variable speed pump rated at 40 L/s at 46 m TDH; Three (3) hydropneumatic tanks each approximately 1,741 L; One (1) chemical pump panel for two (2) sodium hypochlorite pumps each rated at 4.9 L/hr metering into the supply prior to the storage tank; One (1) chemical pump panel for two (2) sodium hypochlorite pumps each rated at 0.41 L/hr metering into the discharge header to the distribution system; One (1) sodium hypochlorite day tank used for both pre- and post- storage dosing; PLC and autodialer, with transmitters for incoming and discharge flow rates, chlorine residuals and pressure; A transfer switch to allow for the connection of a portable generator Notes: Control valve connecting the Booster Pumping Station to the Lake

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LWIS Component Name	LWIS Component Type	LWIS Component Sub-Type	Component Address	Block
				Huron Primary Water Supply System
Ballymote Valve Chamber	Other	Other	Lot 8, Conc. 6 Highbury Ave.,	The Ballymote Waterworks panel is located on the eastern side of Highbury Avenue to the south of Medway Road and to the north of Sunningdale Road. The waterworks obtains water from a 300 mm watermain from the City of London distribution system (Waterworks #260004917). There are two panel boards at this waterworks. The main panel is located furthest south and houses a paperless recording system, a Verbatim alarm dialing system, two small heaters to regulate temperature inside the panel, incoming lines from the water main underground chamber to the online analyzer, a chlorine analyzer and probes, a water sampling tap (J like faucet), a key pad alarm system, the Operations and Maintenance Manual, logbook, and other components. The smaller northern panel houses the digital

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as of 16-AUG-2021

LWIS Component Name	LWIS Component Type	LWIS Component Sub-Type	Component Address	Block
				flow meter display and some electrical components. Adjacent to the north of the panels there is an access manhole to the underground chamber. Within the chamber there is bypass piping, a digital flow meter and other valves and appurtenances. The Operating Authority advised that they have a portable chlorine system that can be used to connect to the Ballymote panel to inject liquid chlorine into the system piping within the chamber if needed . Location: 2576 Highbury Ave UTM Coordinates: NAD 83: UTM Zone 17: 480301 m E, 4768157 m N Equipment: A rechlorination injection point for a portable chlorine feed system Notes: The water supply is obtained from a 300 mm diameter distribution line in the London distribution system 100 mm diameter bypass line equipped with a 100 mm

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as of 16-AUG-2021

LWIS Component Name	LWIS Component Type	LWIS Component Sub-Type	Component Address	Block
				bypass valve
Ilderton Water Tower	Other	Reservoir	22821 Hyde Park Road,	The purpose of the Elevated Water Tower (EWT) is to provide additional pressure and water supply to the community of Ilderton in the event of high demand. In general, treated water enters the water tower during times where demand is below the rated capacity of the BPS and exits during peak flow periods or when the BPS is not in operation to provide additional capacity to the system. A flow meter located on the supply/discharge line monitors flows entering and exiting the elevated tower. In addition to the flow meter, a pressure transmitter is located on the storage tank supply line (draw line) to measure pressure at the tower, which correlates to liquid level within the storage tank. The flow meter and pressure transmitter communicate with the SCADA system for monitoring and communication . Location: 22821 Hyde Park Road

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LWIS Component Name	LWIS Component Type	LWIS Component Sub-Type	Component Address	Block
				in Ilderton Description: Elevated storage tank, 300 mm diameter watermain on Hyde Park Road Capacity: 15.3 m nominal diameter steel tank on a concrete pedestal, having a working storage capacity of 2,050 m3 between high water level of 335.1 m AMSL and low water level of 324.1 m AMSL. Notes: complete with a 300 mm diameter inlet/outlet pipe and a 200 mm diameter overflow pipe discharging overflows into an overland flow rip rap spillway; a valve room located at pedestal ground floor level housing various control valves, piping, flowmeter, alarming system and control instrumentation, complete with lighting, heating and ventilation; access ladder and platform located on the underside of the steel tank, and all other items necessary to have a complete and operable elevated storage tank.
Delaware Rechlorination Station	Other	Booster Station	969 Gideon	The Delaware

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as of 16-AUG-2021

LWIS Component Name	LWIS Component Type	LWIS Component Sub-Type	Component Address	Block
			Drive,	ReChlorination Facility is located at 969 Gideon Drive (within Komoka Provincial Park). The facility consists of a single building surrounded with security fencing which receives treated distribution water from the City of London Distribution System (WW# 260004917). Generally stated, water entering into the Delaware Rechlorination Facility passes by a flow control valve and a chlorine injection point where liquid sodium hypochlorite (chlorine) is injected into the incoming water to boost the concentration of chlorine prior to it entering into the distribution system. The rechlorination system is complete with two chlorine dosing pumps (duty and standby), a container of sodium hypochlorite, an in-line flow meter, an online chlorine analyzer, a paperless recording system with display, pressure gauges and other appurtenances . Location: 969

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LWIS Component Name	LWIS Component Type	LWIS Component Sub-Type	Component Address	Block
				Gideon Dr. UTM Coordinates: NAD 83: UTM Zone 17: 467722 m E., 4754626 m N Equipment: Two (2) (duty and standby) metering pumps each capable of dosing at a rate of 4.4 L/hr of sodium hypochlorite for rechlorination; A chemical storage tank Notes: The water supply is obtained from a 300 mm diameter distribution line in the London distribution system 100 mm diameter bypass line equipped with a 100 mm bypass valve
Komoka Water Tower	Other	Reservoir	10073 Oxbow Drive,	Storage and pressure is provided from a 1,500 m^3 elevated tank. The Kilworth/Komoka Water System serves a population of approximately 2,300 individuals; 1,100 from within the Village of Kilworth and 1,200 from within the Village of Komoka. The elevated water tank is located on Oxbow Drive within approximately 100 metres of

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LWIS Component Name	LWIS Component Type	LWIS Component Sub-Type	Component Address	Block
				the Reservoir Booster / Rechlorination Station . Location: 10073 Oxbow Dr. UTM Coordinates: NAD 83: UTM Zone 17, 464347.9944 m E., 4756220.977 m N Description: 1,500 m3 storage volume
Delaware Water Tower	Other	Other	11229 Longwoods Road,	The Delaware Standpipe is enclosed with security fencing and located on the southern side of Longwoods Road about 200 metres to the east of Springer Road (11229 Longwoods Road). The original standpipe at this location was constructed in 1982 and was approximately 32 metres high and 7.62 m in diameter, with a useable volume of approximately 664 cubic meters and a total volume of 1460 cubic meters. In 2019, full demolition of the original standpipe and control building was completed as a new standpipe and control building was constructed to take its place. The new standpipe is a

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LWIS Component Name	LWIS Component Type	LWIS Component Sub-Type	Component Address	Block
				glass fused unit measuring 37.4 meters in height and 8.53 meters in diameter, with a total volume of 2140 cubic meters and a working volume of 400 cubic meters between the high and low water level. The new control building contains pressure gauges, flow control piping, online controls and other appurtenances. The new standpipe and control building were connected to the distribution system on May 30, 2019. . Location: 11229 Longwoods Rd. UTM Coordinates: NAD 83: UTM Zone 17: 466,675 m E., 4,750,600 m N Description: Standpipe complete with valve house Capacity: An 8.53 m diameter and 37.4 m high glassed fused to steel standpipe, having a total volume of 2,140 m3, and an approximate working volume of 400 m3 between the high water level of and low water level. Notes:

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LWIS Component Name	LWIS Component Type	LWIS Component Sub-Type	Component Address	Block
				The standpipe complete with a mixing system, a 200 mm diameter inlet/outlet pipe, a 250 mm diameter overflow pipe, and a 150 mm diameter drain pipe, discharging overflow and drain into a rip rap area. Associated piping, valves, electrical and mechanical equipment, and instrumentation and operation control in the valve house. Provision for connecting to portable emergency power. Provision of future chlorine injection and monitoring on the incoming supply line and outgoing supply line.
Arva Pumping Station	Other	Pumping Station	Lot 16, Conc. 6 Richmond,	The Arva Pumping Station is located on the eastern side of Richmond Street to the north of Sunningdale Road and to the south of the Village of Arva. The waterworks consists of a single building which receives water from a 1200 mm diameter pipeline maintained by the City of London (Waterworks

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as of 16-AUG-2021

LWIS Component Name	LWIS Component Type	LWIS Component Sub-Type	Component Address	Block
				#260004917). Generally stated, water from the City of London watermain enters into the Arva Pumping Station in the southeastern part of the building where a liquid sodium hypochlorite injection point is also located. The water is directed in a northerly direction, and then in a westerly direction past an inline digital flow meter prior to exiting into the distribution system. A chlorine analyzer is connected to the waterline which is used to measure the concentration of free chlorine as the water leaves the Arva Pumping Station. The Arva Pumping Station is equipped with a container for storing liquid sodium hypochlorite (chlorine) with secondary containment which are currently not being used, duty and standby chlorine dosing pumps, an online paperless recording system, a hydro powered 4500 L/minute vertical turbine booster pump, pressure gauges, flow control

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LWIS Component Name	LWIS Component Type	LWIS Component Sub-Type	Component Address	Block
				valves, a Verbatim alarm dialing system, and other valves and appurtenances . Location: 21466 Richmond St UTM Coordinates: NAD 27: UTM Zone 17: 476300.00 m E., 4765600.00 m N Equipment: One (1) vertical in-line, manually started, booster pump rated at 4500 L/min; Two (2) (duty and standby) metering pumps each capable of dosing at a rate of 1.4 L/hr of sodium hypochlorite for rechlorination, if required Notes: The water supply is obtained from a 1050 mm diameter pipeline from the London distribution system 100 mm diameter bypass line equipped with a 100 mm bypass valve
Kilworth-Komoka Intermediate Booster Station	Other	Booster Station	166 Railway Avenue,	The Komoka Intermediate Booster Station was constructed as part of the upgrades to the water system and its connection to the Komoka Distribution System. The Intermediate Booster Station is

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LWIS Component Name	LWIS Component Type	LWIS Component Sub-Type	Component Address	Block
				located on Railway Avenue, north of Queen Street in Komoka. Under normal operating conditions, water flows into and out of the booster station with flow and pressure being measured. In the event of high flow requirements within the system, the booster pump starts and is rated at 91.2 liters per second to increase flow and pressure. Information related to flow and pressure is relayed to the SCADA system, and within the booster station there is a digital panel system to allow the Operator to review data and trends. . Location: 166 Railway Ave. UTM Coordinates: NAD 83: UTM Zone 17: 465080.00 m E., 4755760.00 m N Equipment: One (1) in-line pump equipped with VFD and rated at 91.2 L/s at a TDH of 20.2 m; SCADA system and flow and pressure monitoring

LWIS Component Name	LWIS Component Type	LWIS Component Sub-Type	Component Address	Block
				Notes: Pump configured to start only in periods of high flow in Kilworth
Ilderton Reservoir And Pumping Station	Other	Pumping Station	Lot 23, Conc. 10 Ilderton Road,	The Ilderton Pumping Station and Reservoir is located at the southwestern intersection of Ilderton Road and Willow Ridge Road in Ilderton Ontario. The waterworks consists of a single building with a below grade reservoir. The Ilderton Pumping Station receives treated water from the Lake Huron Water Supply System (Waterworks #210000791) via a 300 mm diameter pipe. Generally stated, the water enters the Pumping Station to a below-ground storage reservoir with a capacity of 455 cubic metres via a top feed connection in the BPS pump room. From the storage reservoir, water is drawn into the vertical suction line by the operating booster pump. There are three variable speed booster pumps, which operate based on water levels in the elevated tower in lead/lag/standby configuration. Two pumps

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LWIS Component Name	LWIS Component Type	LWIS Component Sub-Type	Component Address	Block
				operate to provide the rated capacity of the system although one pump can operate in lower demand conditions. After each operation cycle the pumps will alternate lead/lag/standby status. In high demand situations the lag pump will operate, matching the performance to the duty pump, and will cease operations when demand drops as dictated by the tower operating levels. A magnetic flow meter on the discharge header provides data to the SCADA system which in turn will display instantaneous and daily total flow from the pumps. The LHPWSS connection provides treated water to Ilderton. Additional sodium hypochlorite is added within the BPS in order to maintain adequate secondary disinfection. The sodium hypochlorite injection point is located immediately upstream of the discharge header flowmeter. Dosing is based upon the incoming chlorine residual, flow rate and required

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as of 16-AUG-2021

LWIS Component Name	LWIS Component Type	LWIS Component Sub-Type	Component Address	Block
				dosing setpoint. The Ilderton Pumping Station is equipped with an online chlorine analyzer, a digital flow meter and display, a SCADA system, a Miltronics reservoir water level meter and display, a 80kW standby diesel generator complete with a diesel fuel storage tank and other valves and appurtenances . Location: 13467 Ilderton Rd (Pumping Station) UTM Coordinates: NAD 27: UTM Zone 17: 469980 m E., 4769860 m N Equipment: Three (3) vertical turbine pumps (two duty, one standby) each rated at 17 L/s at 59 m TDH installed with variable frequency drives (VFD); Two (2) (one duty and one standby) metering pumps each capable of dosing at a rate of 7.5 L/hr of sodium hypochlorite for secondary disinfection if required Notes: The water supply is obtained via connection to the

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LWIS Component Name	LWIS Component Type	LWIS Component Sub-Type	Component Address	Block
				Lake Huron Primary Water Supply System (LHPWSS); Incoming supply to building consists of main 300mm feed which reduces to 200 mm complete with control valve, bypass piping and related appurtenances; One (1) 80 kW standby diesel generator complete with diesel fuel tank; All piping and appurtenances, miscellaneous valves, SCADA and control instrumentation, electrical/ mechanical services, HVAC system, on-line analyzers and flow monitors; Under-ground reservoir below the Ilderton Pumping Station building Capacity 455 m3
Kilworth-Komoka Reservoir Booster / Rechlorination Station	Other	Booster Station	133 Queen Street,	The Komoka Reservoir Booster Station is the main booster station associated with the upgrades to the water system in Komoka and its connection to the Arva Reservoir which receives water from the Lake Huron Water Supply System. It is located near the northeastern corner of Queen Street and Oxbow Drive in Komoka.

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LWIS Component Name	LWIS Component Type	LWIS Component Sub-Type	Component Address	Block
				Generally stated, water from the Arva Reservoir is conveyed via a pipeline into the building and is subsequently conveyed underground to the large circular reservoir (2817 cubic meters) in the rear part of the property. Water from the on-site reservoir is directed back into the Booster Station where it passes through one of two booster pumps rated at 53.7 litres per second and eventually out into the distribution system. There are two chlorine injection points (duty and standby) on the incoming water line, and there are two additional chlorine injection points (duty and standby) on the piping located after the water returns from the large circular reservoir. The liquid chlorine and chlorine pumps are located within a designated room in the western part of the main building which is also equipped with secondary containment. In addition, there are a total of three online chlorine analyzers in the

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LWIS Component Name	LWIS Component Type	LWIS Component Sub-Type	Component Address	Block
				main building; one to measure the free chlorine concentration of incoming water from the Arva Reservoir, one to measure the free chlorine concentration of the water from the on-site Komoka Reservoir, and one to measure the free chlorine concentration of the water just prior to it entering the distribution system in Kilworth and Komoka. In addition, the system is configured with incoming and outgoing flow meters, numerous pressure gauges, air / pressure relief valves and other valves and appurtenances. A SCADA system is located within the main building and it is used to review trends related to the operation of the system and parameters measured . Location: Booster pumping station located adjacent to the reservoir UTM Coordinates: NAD 83: UTM Zone 17: 464350.00 m E., 4756110.00 m N

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as of 16-AUG-2021

LWIS Component Name	LWIS Component Type	LWIS Component Sub-Type	Component Address	Block
				Equipment: One (1) rechlorination facility consisting of four (4) (2 duty and 2 standby) metering pumps and two (2) sodium hypochlorite storage tanks; Two (2) booster pumps each rated at 53.7 L/s at a TDH of 34.3 m and equipped with variable frequency drive: On-Ground storage tank 20.43 m diameter and 8.7 m high (2817 m3 and 2718 m3 useable capacity Standby Power: 150 kW diesel generator set Notes: SCADA System