Ministry of the Environment, Conservation and Parks

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

Division de la conformité en matière d'eau potable et d'environnement
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Ontario

April 9, 2025

File no. SI-ES-ES-TA-540

The Corporation of the Town of Essex
33 Talbot Street South
Essex, ON N8M 1A8

Attention: Mr. Rob Mackie, C. Tech., Manager of Environmental Services

Re: Essex Harrow - Colchester Drinking Water System Inspection Report (WW# 210000130)

Dear Mr. Mackie,

Enclosed is the report on the 2024-25 inspection of the Essex Harrow - Colchester Drinking Water System and the corresponding Inspection Rating Report (IRR) and Risk Methodology document.

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 Councils" on the Drinking Water Ontario website at https://www.ontario.ca/environment-and-energy/taking-care-your-drinking-water-guide-members-municipal-councils.

The IRR is a summarized quantitative measure of the drinking water system's annual inspection and is published in the Ministry's Chief Drinking Water Inspector's Annual Report. The Risk Methodology document describes the risk rating methodology which has been applied to the findings of the Ministry's municipal residential drinking water system inspection results.

If you have any questions or concerns regarding the rating, please contact Mark Smith, Water Compliance Supervisor, at 519-317-8116.

Yours truly,

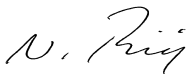
Neville Rising, P.Eng.
Provincial Officer
London District Office

cc. Windsor – Essex County Health Unit
Essex Region Conservation Authority
London District File
Warren Higgins, OCWA
Kassidy Bowden, OCWA

ESSEX DRINKING WATER SYSTEM (HARROW-COLCHESTER SOUTH)
Physical Address: 405 CLITHEROW ST, , ESSEX, ON N0R 1G0

INSPECTION REPORT

System Number:	210000130
Entity:	THE CORPORATION OF THE TOWN OF ESSEX ONTARIO CLEAN WATER AGENCY
Inspection Start Date:	February 03, 2025
Site Inspection Date:	February 04, 2025
Inspection End Date:	March 28, 2025
Inspected By:	Neville Rising
Badge #:	1039



(signature)

INTRODUCTION

Purpose

This unannounced, detailed inspection was conducted to confirm compliance with Ministry of the Environment, Conservation and Parks' (MECP) legislation and conformance with ministry drinking water policies and guidelines.

Scope

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 and the operation of the system.

The inspection of the drinking water system included both the physical inspection of the component parts of the system listed in section 4 "Systems Components" of the report and the review of data and documents associated with the operation of the drinking water system during the review period.

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.

Facility Contacts and Dates

The drinking water system is owned by the Corporation of the Town of Essex . The Treatment Plant is operated by the Ontario Clean Water Agency ("OCWA"), while the Corporation of the Town of Essex oversees the distribution system.

The system serves an estimated population of 10400 and is categorized as a Large Municipal Residential System. Information reviewed for this inspection covered the time period of January 1, 2024 to December 31, 2024.

Systems/Components

All locations associated with primary disinfection were visited as part of this inspection. The

following sites were visited as part of the inspection of the drinking water system:

1. Low Lift Pumping Station including:
   a. Intake Pipe / Chemical Feed Lines
   b. Manual and Travelling Screens
   c. Low Lift Pumps

2. Treatment Plant including:
   a. Solids Contact Upflow Clarifier
   b. Dual Filter System
   c. Clearwells / Reservoirs
   d. Chemical Addition including Coagulant, Coagulant Aid, Filter Aid, Powdered Activated Carbon, Chlorine Gas
   e. Two Earthen Settling Ponds

An outstation is a component of a drinking water system that is not located at either a water treatment plant or a well supply and is generally not associated with primary treatment, for example reservoirs, booster stations, and re-chlorination facilities located within the distribution system. Outstations may be visited on a rotational basis as part of a ministry inspection. This inspection included the inspection of:

1. Harrow Water Tower

Permissions/Approvals

This drinking water system was subject to specific conditions contained within the following permissions and/or approvals (please note this list is not exhaustive) at the time of the inspection in addition to the requirements of the SDWA and its regulations:

1. Drinking Water Works Permit #029-201, Issue #3 dated April 6, 2021
2. Municipal Drinking Water License #029-101, Issue #3 dated April 6, 2021
3. Permit to Take Water # 4088-9KDN6D dated May 23, 2014
4. Permit to Take Water # 6356-D34JXB dated April 22, 2024

NON-COMPLIANCE

The following item(s) have been identified as non-compliance, based on a "No" response captured for a legislative question(s). For additional information on each question see the Inspection Details section of the report.

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

Item	Question	Compliance Response/Corrective Action(s)
NC-1	**Question ID:** DWMR1113001 Were changes to the system registration information provided to the ministry within ten (10) days of the change?	Changes to the system registration information were not provided within ten (10) days of the change. Corrective Action: The Owner / Operating Authority shall forthwith make appropriate modifications to their drinking water works profile information to ensure it is accurate and up to date as prescribed by Ontario Regulation 170/03 – Section 10.1(3). The aforementioned modifications can be emailed to waterforms@ontario.ca. Additionally, the Owner / Operating Authority shall forward the aforementioned modifications to Neville Rising of the Ministry of Environment, Conservation and Parks upon completion.
NC-2	**Question ID:** DWMR1038001 Was continuous monitoring equipment that was being utilized to fulfill O. Reg. 170/03 requirements performing tests for the parameters with at least the minimum frequency and recording data with the prescribed format?	Continuous monitoring equipment that was being utilized to fulfill O. Reg. 170/03 requirements was not performing tests for the parameters with at least the minimum frequency specified in the Table in Schedule 6 of O. Reg. 170/03 and/or was not recording data with the prescribed format. Corrective Action: Form herein, the Owner / Operating Authority shall ensure that continuous monitoring equipment which performs testing and recording for the parameters referenced in Ontario Regulation 170/03 - Schedule 6-5 does so

		within the prescribed format and with at least the minimum frequency required. Compliance with this requirement will be assessed during the next inspection of the drinking water system. It is strongly recommended that the Owner / Operating Authority determine a method in which all data pertinent to primary disinfection, including the aforementioned turbidity and free chlorine, but not limited to plant flow rates, reservoir levels / volumes, chemical coagulant pumping rates, raw water flow rates, pH, temperature, CT calculations (Required and Achieved) as applicable can be exported from the continuous analyzers and stored on spreadsheets for review purposes. This method should ensure compliance with Ontario Regulation 170/03 - Schedule 6-5 and also provide all pertinent data to illustrate all requirements of disinfection have been met with.
NC-3	**Question ID:** DWMR1083001 Were treated microbiological sampling requirements prescribed by Schedule 10-3 of O. Reg. 170/03 for large municipal residential systems met?	Treated microbiological sampling requirements prescribed by Schedule 10-3 of O. Reg. 170/03 were not met. Corrective Action: From herein, the Owner / Operating Authority shall ensure that all collected treated water microbiological samples are tested as per the requirements prescribed by Ontario Regulation 170/03 – Schedule 10-3 and include E. coli, total coliforms and general bacteria population expressed as colony counts on a heterotrophic plate count.

RECOMMENDATIONS

The following item(s) have been identified as non-conformance, based on a "No" response captured for a best management practice (BMP) question(s). For additional information on each question see the Inspection Details section of the report.

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

Item	Question	Recommendation(s)
R-1	**Question ID:** DWMR1069001 Were all storage facilities completely covered and secure?	Storage facilities were not completely covered and secure. Best Management Practices: It is recommended that the Owner / Operating Authority install appropriate seals on all hatches as a means of protecting the finished treated water as prescribed by the general requirements of Section 7 of the Ten States Standards (2012 Edition).
R-2	**Question ID:** DWMR1070001 Were air vents and overflows associated with reservoirs and elevated storage structures equipped with screens?	Air vents and overflows associated with reservoirs and elevated storage structures were not equipped with screens. Best Management Practice: It is recommended that the Owner / Operating Authority assess the Tower's overflow pipe to determine if it is fitted with an appropriate screen. In the event a screen is present it is recommended that this screen be consistent with those recommended in Section 7.07 of the Ten States Standards (2012 Edition). In the event a screen is not present, it is recommended one be installed (or an acceptable alternative) as recommended in Section 7.07 of the Ten States Standards (2012 Edition).

INSPECTION DETAILS

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

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

Question ID	DWMR1012001	**Question Type**	Legislative

Legislative Requirement(s):
SDWA | 31 | (1);

Question:
Did the owner have a harmful algal bloom monitoring plan in place that met the requirements of the Municipal Drinking Water Licence?

Compliance Response(s)/Corrective Action(s)/Observation(s):
The owner had a harmful algal bloom monitoring plan in place which met the requirements.

Municipal Drinking Water License #029-102, Issue #3, Schedule C, Section 6.0 stipulates the requirement for a Harmful Algal monitoring, reporting and sampling plan ("Plan") when a bloom is suspected or present.

Generally stated, a Harmful Algal Bloom ("HAB") is considered suspected or occurring when:

6.2.1 the owner or operating authority has observed an algal bloom:
a) near the shoreline at or near the source water intake(s) described in drinking water works permit #029-201, or
b) where the intake has an Intake Protection Zone in a source protection plan, within IPZ-1, or
c) within a circle that has a radius, measured from the intake, equal to the distance from the intake to the farthest edge of IPZ-2.
6.2.2 microcystin has been detected in a raw or treated water sample; and/or,
6.2.3 the owner has received any form of notification related to an algal bloom from the Ministry, a Medical Officer of Health, or the public; or,
6.2.4 the presence of or identification of cyanobacteria has been determined though optical probes or other analytic techniques used by the drinking water system.

Section 6.3 of Schedule C denotes details related to the visual monitoring of harmful blooms at or near the drinking water system intake(s),

Section 6.4 of Schedule C stipulates that water samples collected must be:

6.4.1 collected, at a minimum, once per week, or as otherwise directed by the Ministry or the medical officer of health;
6.4.2 collected prior to any treatment, if the sample is taken from raw water;
6.4.3 collected at the point of entry into the distribution system, if the sample is taken from treated water;

6.4.4 collected from the shoreline by the drinking water system, if applicable based on Condition 6.3.1;
6.4.5 submitted to a laboratory licensed to perform ELISA testing for total microcystin;
6.4.6 repeatedly collected until 3 consecutive samples have shown non-detection of microcystin and the algal bloom is no longer suspected or visually observed.

As a result of Schedule C - Section 6 requirements, the Owner / Operating Authority prepared Standard Operating Procedure (SOP) OCWA–C3-41 – Harmful Algal Bloom Monitoring, Reporting and Sampling Plan issued May 30, 2023 to be used by operational staff. Generally stated, the plan provided adheres to the requirement of Section 6 or Schedule C including visual monitoring, reporting and water sampling.

In the event that a bloom is suspected, the SOP stipulates notifications that are required, mandatory sampling requirements and assessment of test results, and necessary actions depending on the laboratory results received.

Routine Monitoring
1. Daily visual monitoring for blooms at the low lift
2. Monitor operations parameters which may indicate potential blooms – taste, odour, colour, pH etc.
3. Assess news sources for potential blooms

Routine Sampling – Weekly on Monday when low lift turned off
1. June 1 – July 14 – RW samples
2. July 15 – sept 30 – RW and TW samples
3. Oct 1 – 31 – RW samples

Mandatory Sampling – If there is a suspected bloom
1. RW and TW once per week until there is Non Detect for microcystins in any samples (frequency may change as directed by ALL)
2. SOP provides table to interpret microcystin results and corrective actions / notifications

Over the course of the inspection period, the Operating Authority collected the required raw and treated water samples. Raw water sample results ranged from less than the method detection limit to 0.5 mg/L, while all treated water samples were reported with concentrations less than the method detection limit. All results were less the applicable limit of 1.5 mg/L. Additionally, the Operating Authority advised that there were no visual or operational indicators of the presence of harmful algal blooms over the inspection period.

Question ID	DWMR1010001	**Question Type**	BMP

Legislative Requirement(s):
Not Applicable

Question:
Were trends in source water quality monitored?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Trends in source water quality were monitored.

The Owner / Operating Authority collect raw water samples for microbiological testing including E. Coli, Total Coliform, and Total Coliform Background testing on a weekly basis, and Clostridium Perfringens for testing typically on a monthly basis. During warmer periods, when algal blooms are most likely to occur, the Owner / Operating Authority collects microcystin raw samples as part of their Harmful Algal bloom testing and reporting requirements.

In addition, downstream of the low lift pumps at the Treatment Plant the Owner / Operating Authority has installed continuous analyzers to monitor raw water turbidity, temperature, pH flow, and residual free chlorine that may be present due to the seasonal addition of sodium hypochlorite at the intake pipe within Lake Erie.

These trends in raw water monitoring are reviewed and they can provide critical information for the overall operation of the Water Treatment Plant.

Question ID	DWMR1014001	**Question Type**	Legislative

Legislative Requirement(s):
SDWA | 31 | (1);

Question:
Was flow monitoring performed as required by the Municipal Drinking Water Licence or Drinking Water Works Permit?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Flow monitoring was performed as required.

Municipal Drinking Water License #029-101 - Issue #3, Section 2 of Schedule C stipulates that the flow at the Treatment Plant must be measured and recorded as follows:

1. The flow rate (L/s) and daily volume (m3/day) of treated water that flows from the treatment subsystem to the distribution system.

2. The flow rate (L/s) and daily volume (m3/day) of water that flows into the treatment subsystem.

The Treatment Plant is equipped with a continuous flow meter located downstream of the low lift pumps to measure and record the flow of all raw water into the Treatment Plant. In addition, there is a continuous flow meter located downstream of the high lift pumps which measures all of the flow leaving the Treatment Plant and entering into the distribution system.

It should be also noted that there are additional flow meters located throughout the treatment

train which are used for operational purposes including:

1. Flow meter off of Filter #1
2. Flow meter off of Filter #2
3. Back wash flow meter
4. Jet Wash flow meter

Question ID	DWMR1015001	Question Type	Legislative

Legislative Requirement(s):
SDWA | 31 | (1);

Question:
Were flow measuring devices calibrated or verified in accordance with the requirements of the Municipal Drinking Water Licence?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Flow measuring devices were calibrated or verified as required.

Municipal Drinking Water License #029-101, Issue #3, Schedule C – Section 3.0 stipulates that all flow measuring devices must be calibrated in accordance with the manufacturer's instructions, and in the event that the manufacturer's instructions do not indicate how often to check and calibrate a flow measuring device, then the equipment must be calibrated at least once every 12 months.

Condition 3.2.1 of the Municipal Drinking Water Licence further stipulates the following in reference to the 12 month period referenced in Condition 3.2:

"For greater certainty, if condition 3.2 applies, the equipment shall be checked and calibrated not more than 30 days after the first anniversary of the day the equipment was checked and calibrated in the previous 12 month period."

Calibration Records were provided for the following meters:

1. Raw Water Flow Meter – July 2, 2024 (Essex WTP Raw Flow)
2. Filter Flow Meter – July 2, 2024 (Harrow WTP FIT 1079)
3. Filter Flow Meter – July 2, 2024 (Harrow WTP (FIT1655))
4. Back Wash Flow Meter – July 2, 2024
5. Jet Wash Meter Flow – July 2, 2024
6. Treated Water Flow Meter – July 2, 2024

Question ID	DWMR1016001	Question Type	Legislative

Legislative Requirement(s):
SDWA | 31 | (1);

Question:
Was the owner in compliance with the conditions associated with maximum flow rate or the rated/operational capacity in the Municipal Drinking Water Licence?

Compliance Response(s)/Corrective Action(s)/Observation(s):
The owner was in compliance with the conditions associated with maximum flow rate and/or the rated/operational capacity conditions.

Municipal Drinking Water License #029-101 - Issue #3, Section 1.1 of Schedule C stipulates the following Rated Capacity / Operational Capacity at the Treatment Plant:

1. Harrow Colchester South Water Treatment Plant – Rated Capacity = 10228 m3/day

According to the daily summary reports provided for review, the rated capacity for the Treatment Plant was not exceeded over the course of the inspection period.

Question ID	DWMR1013001	**Question Type**	Legislative

Legislative Requirement(s):
OWRA | 34 | (3);

Question:
Was the owner in compliance with all conditions of the Permit To Take Water?

Compliance Response(s)/Corrective Action(s)/Observation(s):
The owner was in compliance with all conditions of the Permit To Take Water.

Over the course of the inspection period, there were two Permits to Take Water ("PTTW") in force including:

1. PTTW #4088-9KDN6D dated May 23, 2014
2. PTTW # 6356-D34JXB dated April 22, 2024 (revoked and replaced PTTW #4088-9KDN6D.

As presented within both of the Permits, the Treatment Plant draws its raw water supply from Lake Erie and it is limited to a maximum raw water flow rate of 21154 L/minute (30459 m3/day)

Generally stated both Permits require the Owner / Operating Authority to measure and record all water takings including the dates and times of the water taking, and the total amount of water taken each day. The more recent PTTW # 6356-D34JXB includes the method the takings shall be measured and the requirement to submit daily water taking data on or before March 31 each year as described below and taken from Section 4 (Monitoring) of the Permit:

"The Permit Holder shall maintain a record of all water takings. The daily volume of water taken shall be measured by a flow meter or calculated in accordance with the method described in the application for this Permit, or as otherwise accepted by the Director. This record shall include the dates and times of water takings, the rates of pumping, and the total measured amounts of water pumped per day for each day that water is taken under the

authorization of this Permit. A separate record shall be maintained for each source. The Permit Holder shall keep all required records up to date and available at or near the site of the taking and shall produce the records immediately for inspection by a Provincial Officer upon his or her request. The Permit Holder shall submit, on or before March 31st in every year, the daily water taking data collected and recorded for the previous year to the ministry's Water Taking Reporting System."

Over the course of the inspection period, the Owner / Operating Authority measured and recorded raw water takings as prescribed by the requirements of both Permits to Take Water, and the maximum rates of taking were not exceeded. PTTW # 6356-D34JXB dated April 22, 2024 requires that daily water taking data be submitted by March 31 each year. Given this Permit was issued in April of 2024, the requirement to submit the aforementioned data has not yet occurred, but the Owner / Operating Authority is reminded that this will be required starting in 2025.

Question ID	DWMR1018001	**Question Type**	Legislative

Legislative Requirement(s):
SDWA | 31 | (1);

Question:
Did the owner ensure that equipment was installed in accordance with Schedule A and Schedule C of the Drinking Water Works Permit?

Compliance Response(s)/Corrective Action(s)/Observation(s):
The owner ensured that equipment was installed as required.

Generally stated, the equipment noted in the Drinking Water Works Permit was present at the time of the inspection.

Question ID	DWMR1020001	**Question Type**	Legislative

Legislative Requirement(s):
SDWA | 31 | (1);

Question:
Were Form 1 documents prepared as required?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Form 1 documents were prepared as required.

Over the course of the inspection period, there was one Form 1 document prepared with regard to installation of a 250 mm diameter watermain associated with the Tom Wright Drain.

Question ID	DWMR1021001	**Question Type**	Legislative

Legislative Requirement(s):
SDWA | 31 | (1);

Question:
Were Form 2 documents prepared as required?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Form 2 documents were prepared as required.

Over the course of the inspection period, there was one Form 2 document submitted to account for minor modifications including work conducted on the Clarifier Pipe Gallery and the Regulator.

Question ID	DWMR1028001	Question Type	Legislative

Legislative Requirement(s):
SDWA | 31 | (1);

Question:
Were up-to-date plans for the drinking water system made available in such a manner that they could be readily viewed by all persons responsible for all or part of the operation of the drinking water system, in accordance with the Drinking Water Works Permit and Municipal Drinking Water Licence?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Plans for the drinking water system were kept up-to-date and made available as required.

It is understood that as built plans for the water system are stored at the Treatment Plant and are accessible to the Operating Authority. In addition, the Operating Authority provided a process and instrumentation diagram dated October 2020 which is understood to be representative of the Treatment Plant.

The distribution mapping system is maintained by the Town of Essex and is understood to be a online system which includes pipe sizes, valves, hydrants, newly installed watermains, etc. Updates to this map are made as soon as possible when there are required changes.

Question ID	DWMR1025001	Question Type	Legislative

Legislative Requirement(s):
SDWA | 31 | (1);

Question:
Were all parts of the drinking water system that came in contact with drinking water disinfected in accordance with a procedure listed in Schedule B of the Drinking Water Works Permit?

Compliance Response(s)/Corrective Action(s)/Observation(s):
All parts of the drinking water system were disinfected as required.

Drinking Water Works Permit #029-201, Issues #3, Schedule B - 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 accordance with the applicable provisions of the following documents:

a) Until November 21, 2021 the ministry's Watermain Disinfection Procedure, dated November 2015. As of November 22, 2021, the ministry's Watermain Disinfection Procedure, dated August 1, 2020;
b) Subject to condition 2.3.2, any updated version of the ministry's Watermain Disinfection Procedure;
c) AWWA C652 – Standard for Disinfection of Water-Storage Facilities;
d) AWWA C653 – Standard for Disinfection of Water Treatment Plants; and
e) AWWA C654 – Standard for Disinfection of Wells.

As part of this inspection the Owner / Operating Authority provided a single watermain commissioning form for the water system. Generally stated, the work completed was compliant with the requirements prescribed by Section 2.3 of Drinking Water Works Permit #029-201.

Question ID	DWMR1023001	**Question Type**	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 1-2 | (2);

Question:
Did records indicate that the treatment equipment was operated in a manner that achieved the design capabilities prescribed by O. Reg. 170/03, Drinking Water Works Permit and/or Municipal Drinking Water Licence at all times that water was being supplied to consumers?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Records indicated that the treatment equipment was operated in a manner that achieved the design capabilities prescribed.

The raw water associated with this water system is a surface water source (Lake Erie), and as such, treatment requirements include 2, 3 and 4 log inactivation of Cryptosporidium, Giardia, and Viruses respectively. Primary disinfection at the plant is achieved through the use of chlorine gas with conventional filtration during which chemical coagulant is injected at all times while the Treatment Plant is operational.

According to Municipal Drinking Water License # 029-101, Schedule E, Conventional Filtration with continuous injection of a chemical coagulant accounts for the following level of treatment:

1. 2 Log Inactivation of Cryptosporidium Oocysts
2. 2.5 Log Inactivation of Giardia Cysts
3. 2 Log Inactivation of Viruses

In addition, Chlorination must account for the following level of treatment in order to meet with

the required log removal / inactivation credits.

1. 0 Log Inactivation of Cryptosporidium Oocysts
2. 0.5+ Log Inactivation of Giardia Cysts
3. 2+ Log Inactivation of Viruses

In 2017, concerns were raised over the baffling factors assigned to the clearwell cells and primary disinfection. As such, the Owner / Operating Authority commissioned a tracer study to assess for any potential short circuiting in the system. According to a report prepared by OCWA on January 15, 2019 and titled "Summary of the Clearwell Tracer Study at the Harrow-Colchester South WTP", there were adjustments made to the baffling factors for Cell 1 and Cells 2-4, which resulted in amended calculations for primary disinfection and CT. The tracer study indicated that the limiting treatment factor for primary disinfection was the inactivation of Giardia Cysts and they assigned a required CT value of 62 mg/L* time with a pH value of 8.5 and Temperature of 0.5 degrees. This CT value was validated in the Procedure for Disinfection of Drinking Water in Ontario. Given the above, the limiting factors for disinfection using chlorination include the following worst case conditions.

1. Cell 1 Baffling Factor = 0.18
2. Cell 2-4 Baffling Factors = 0.52
3. Total Clearwell Volume = 780.35 m3
4. Effective Clearwell Volume = 374.08 m3
5. Require CT for Giardia at T=0.5 C, pH=8.5 = 62 mg/L* time
6. Maximum Flow Rate = 10288 m3/d (7.1 m3/min)
7. Assigned Minimum Reservoir Level = 1.0 m
8. Assigned Minimum TW Free Chlorine Concentration = 1.18 mg/L
9. Calculated Worst Case CT = 62.15 mg/L* time (which is greater than required CT = 62)

Daily trend curves for filter effluent and free chlorine residual were provided for review as continuous data from the online analyzers was not available. Trend curves for flow rates and reservoir level / volume were not available for review. Logsheet entries included the minimum, maximum and mean daily concentrations for free chlorine and turbidity at the Treatment Plant. On occasion, the minimum concentration of free chlorine was less than the stated 1.18 mg/L, however, the Owner / Operating Authority provided daily comparisons of the critical values for CT Required relative to CT Achieved each day (CT calculator), and the results indicate that primary disinfection through chlorination was met with over the course of the inspection period. The calculation of CT is understood to include all pertinent parameters associated with primary disinfection including flow rates, baffling factors, reservoir levels / volumes, pH, temperature, and free chlorine concentrations.

In addition, based on the logsheet entries, there were no instances when the turbidity levels were considered non-compliant over the inspection period. In addition, during treatment, chemical coagulant was continuously injected and the filter turbidity was maintained at a concentration of less than 0.3 NTU in 95% of the measurements conducted on a monthly basis.

Secondary disinfection within the distribution system is maintained through the use of chlorine gas which is injected at the Treatment Plant. According to the Operating Authority and data reviewed, the concentration of free chlorine within the distribution system was greater than the minimum requirement of 0.05 mg/L. As such it is inferred that adequate secondary disinfection within the distribution system was maintained over the course of the inspection period.

Question ID	DWMR1027001	**Question Type**	Legislative

Legislative Requirement(s):
SDWA | 31 | (1);

Question:
Did the owner have evidence indicating that chemicals and materials that came in contact with water within the drinking water system met all applicable AWWA and ANSI standards in accordance with the Municipal Drinking Water Licence and Drinking Water Works Permit?

Compliance Response(s)/Corrective Action(s)/Observation(s):
The owner had evidence indicating that chemicals and materials that came in contact with water within the drinking water system met the applicable standards.

The Owner / Operating Authority provided NSF / ANSI documentation for the following chemicals used at the Treatment Plant:

1. Poly(Diallydimethylammonium Chloride) "Cat-Floc 8103 Plus" – Max Use = 57 mg/L
2. Chlorine Gas – Max use = 30 mg/L
3. Magnafloc LT Powder
4. Sodium Hypochlorite "Lavo" – Max Use = Variable depending on selected type
5. Polyacrylamide (Magnafloc LT) – Various Trade Names – Max Use = 1 mg/L
6. Powder Activated Carbon "COL-PL60-800"

Question ID	DWMR1024001	**Question Type**	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 1-2 | (2);

Question:
Did records confirm that the water treatment equipment which provides chlorination or chloramination for secondary disinfection was operated as required?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Records confirmed that the water treatment equipment which provides chlorination or chloramination for secondary disinfection was operated as required.

As presented within Drinking Water Works Permit #029-201, Issue #3, the Treatment Plant is equipped with seasonal prechlorination utilizing sodium hypochlorite, and chlorine gas which is injected upstream of the filter inlet chamber and used for primary disinfection and subsequent secondary disinfection within the distribution system.

Ontario Regulation 170/03 – Schedule 1-2(2) stipulates that equipment is operated such that at all times, the minimum concentration of free chlorine in the distribution system is never less than 0.05 mg/L. Documentation provided by the Operating Authority has indicated that all grab samples collected for free chlorine testing in the distribution system were greater than 0.05 mg/L.

Question ID	DWMR1033001	Question Type	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 7-2 | (3); SDWA | O. Reg. 170/03 | 7-2 | (4);

Question:
Was secondary disinfectant residual tested as required for the large municipal residential distribution system?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Secondary disinfectant residual was tested as required.

Ontario Regulation 170/03 – Schedule 7-2(3) and 7-2(4) stipulates that at least seven distribution samples are collected for testing each week for free chlorine residual. A sample for chlorine residual testing can be collected each day, otherwise at least four samples must be collected on one day, and at least three samples must be collected on another day in the same week, at least 48 hours apart.

The Operating Authority uses a portable meter to collect free chlorine residual readings throughout the distribution system, some of which are in conjunction with the collection of microbiological samples. Based on the sampling regime, the Operating Authority collects at least four samples on one day in a week, and at least three samples on another day in the same week, separated by at least 48 hours.

Question ID	DWMR1049001	Question Type	BMP

Legislative Requirement(s):
Not Applicable

Question:
Did records confirm that disinfectant residuals were routinely checked at the extremities and dead ends of the distribution system?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Records confirmed that disinfectant residuals were routinely checked at the extremities and dead ends of the distribution system.

The Owner / Operating Authority advised that much of the distribution is considered to be looped and as such, there are limited dead ends. An auto flushing device has been installed within the distribution system as a means of maintaining appropriate free chlorine residuals, and efforts are made by the distribution system operators to check areas of low chlorine residual.

Question ID	DWMR1036001	Question Type	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 6-7 | (1);

Question:
Where continuous monitoring equipment was not used for chlorine residual analysis, were samples tested using an acceptable portable device?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Samples for chlorine residual analysis were tested using an acceptable portable device.

The Operating Authority uses Hach pocket colorimeters and a bench top model in the laboratory.

Question ID	DWMR1030001	Question Type	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 7-2 | (1); SDWA | O. Reg. 170/03 | 7-2 | (2);

Question:
Was primary disinfection chlorine monitoring being conducted at a location approved by Municipal Drinking Water Licence and/or Drinking Water Works Permit or at/near a location where the intended CT had just been achieved?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Primary disinfection chlorine monitoring was conducted as required.

Ontario Regulation 170/03 – Schedule 7-2(1) stipulates the owner of a drinking water system that provides chlorination for primary disinfection shall ensure that sampling and testing for free chlorine residual is carried out by continuous monitoring equipment in the treatment process at or near a location where the intended contact time has just been completed in accordance with the Ministry's Procedure for Disinfection of Drinking Water in Ontario.

As presented within the Operations and Maintenance Manual, the Essex Treatment Plant is equipped with a combination of reservoirs and a clearwell to provide sufficient time for the injected chlorine gas to react with the raw water and meet with adequate primary disinfection. At the time of the inspection, there was a free chlorine continuous analyzer located within the clearwell of the Treatment Plant which is used for operational purposes. In addition, there is a final treated water free chlorine continuous analyzer located on the downstream side of the reservoirs which is considered to be the regulatory analyzer used to measure the free chlorine concentration of the treated water entering into the distribution system and whether primary disinfection has been met with.

Question ID	DWMR1031001	Question Type	BMP

Legislative Requirement(s):
Not Applicable

Question:
Were operators aware of the operational criteria necessary to achieve primary disinfection within the drinking water system?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Operators were aware of the operational criteria necessary to achieve primary disinfection within the drinking water system.

In 2017, concerns were raised over the baffling factors assigned to the reservoir / clearwell cells and primary disinfection. As such, the Owner / Operating Authority commissioned a tracer study to assess for any potential short circuiting in the system. According to a report prepared by OCWA on January 15, 2019 and titled "Summary of the Clearwell Tracer Study at the Harrow-Colchester South WTP", there were adjustments made to the baffling factors for Cell 1 and Cells 2-4, which resulted in amended calculations for primary disinfection and CT. The tracer study indicated that the limiting treatment factor for primary disinfection was the inactivation of Giardia Cysts and they assigned a required CT value of 62 mg/L* time with a pH value of 8.5 and Temperature of 0.5 degrees. This CT value was validated in the Procedure for Disinfection of Drinking Water in Ontario. Given the above, the limiting factors for disinfection using chlorination include the following worst case conditions.

1. Cell 1 Baffling Factor = 0.18
2. Cell 2-4 Baffling Factors = 0.52
3. Total Clearwell Volume = 780.35 m3
4. Effective Clearwell Volume = 374.08 m3
5. Require CT for Giardia at T=0.5 C, pH=8.5 = 62 mg/L* time
6. Maximum Flow Rate = 10288 m3/d (7.1 m3/min)
7. Assigned Minimum Reservoir Level = 1.0 m
8. Assigned Minimum TW Free Chlorine Concentration = 1.18 mg/L
9. Calculated Worst Case CT = 62.15 mg/L* time (which is greater than required CT = 62)

The Operating Authority is aware of the critical operational parameters associated with achieving primary disinfection at the Treatment Plant, and understand both chlorination with appropriate contact time, and chemically assisted filtration must both be operational in order to meet with the minimum requirements.

Although the Operating Authority is aware of the worst case parameters referenced above for disinfection using chlorination and contact time, they understand the variability associated with chlorination and a CT calculator is utilized which continually assesses the water quality for parameters such as flow rates, free chlorine concentration, reservoir / clearwell depths, temperature and pH. In addition, the Operating Authority is aware that turbidity off of each effluent filter line must be at a concentration of less than 0.3 NTU in 95% of the measurements conducted on a monthly basis.

Question ID	DWMR1032001	Question Type	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 7-3 | (2);

Question:
If the drinking water system obtained water from a surface water source and provided filtration, was continuous monitoring of each filter effluent line performed for turbidity?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Continuous monitoring of each filter effluent line was performed for turbidity.

Ontario Regulation 170/03 – Schedule 7-3(2) stipulates that if a drinking water system obtains its raw water source from surface water, then the owner of the system shall ensure that sampling and testing for turbidity is carried out by continuous monitoring equipment on each filter effluent line.

The Essex Harrow-Colchester surface water Treatment Plant utilizes two parallel filter beds that are each equipped with individual continuous turbidity analyzers. The Operating Authority advised that the turbidity analyzers are functional whenever the plant is operating and measure the turbidity levels at least every 15 minutes as prescribed by the Table presented in Ontario Regulation 170/03 – Schedule 6.5. It should be noted that the Treatment Plant is not equipped with recording capabilities of the continuous data, but provided daily trending curves to indicate these analyzers were operational over the inspection period.

Question ID	DWMR1035001	Question Type	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 6-5 | (1)1-4;

Question:
Were operators examining continuous monitoring test results and did they examine the results within 72 hours of the test?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Operators were examining continuous monitoring test results as required.

The Owner / Operating Authority advised that the daily trend reports summarizing the continuous monitoring data for free chlorine and turbidity from each filter are reviewed on a daily basis by the Operators.

Question ID	DWMR1038001	Question Type	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 6-5 | (1)1-4;

Question:
Was continuous monitoring equipment that was being utilized to fulfill O. Reg. 170/03

requirements performing tests for the parameters with at least the minimum frequency and recording data with the prescribed format?

Compliance Response(s)/Corrective Action(s)/Observation(s):

Continuous monitoring equipment that was being utilized to fulfill O. Reg. 170/03 requirements was not performing tests for the parameters with at least the minimum frequency specified in the Table in Schedule 6 of O. Reg. 170/03 and/or was not recording data with the prescribed format.

Corrective Action:

Form herein, the Owner / Operating Authority shall ensure that continuous monitoring equipment which performs testing and recording for the parameters referenced in Ontario Regulation 170/03 - Schedule 6-5 does so within the prescribed format and with at least the minimum frequency required. Compliance with this requirement will be assessed during the next inspection of the drinking water system.

It is strongly recommended that the Owner / Operating Authority determine a method in which all data pertinent to primary disinfection, including the aforementioned turbidity and free chlorine, but not limited to plant flow rates, reservoir levels / volumes, chemical coagulant pumping rates, raw water flow rates, pH, temperature, CT calculations (Required and Achieved) as applicable can be exported from the continuous analyzers and stored on spreadsheets for review purposes. This method should ensure compliance with Ontario Regulation 170/03 - Schedule 6-5 and also provide all pertinent data to illustrate all requirements of disinfection have been met with.

Ontario Regulation 170/03 – Schedule 6.5 stipulates

1. The continuous monitoring equipment must, except when no water is being directed to users of water sampled by the equipment,
i. test for the parameter with at least the minimum frequency specified in the Table for the parameter, and
ii. record the date, time, sampling location and result of every test for the parameter with at least the minimum frequency referred to in subparagraph i.
2. If the continuous monitoring equipment tests for a parameter more often than is required by subparagraph 1 i, the equipment may, instead of complying with subparagraph 1 ii,
i. record the minimum, maximum and mean results of tests for the parameter for every period that is equal to the length of time referred to in subparagraph 1 i, along with the sampling location, the date of the tests conducted during the period and the time at the end of the period, and
ii. record the result of every test that causes an alarm to signal under paragraph 1 of subsection (1.1), along with the sampling location and the date and time of the test.

As part of this inspection review, continuous data from the online free chlorine and turbidity

analyzers was not available, but rather, the Owner / Operating Authority provided daily trend curves associated with measurements from these analyzers. Based on the trend curves, it was not possible to determine the frequency with which the measurements were taken, however, the Operating Authority advised that measurements are taken approximately each second. Given the trend curves provided for review, compliance with the aforementioned frequency of testing prescribed by Ontario Regulation 170/03 – Schedule 6-5 (1) or 6-5(2) could not be confirmed.

Question ID	DWMR1037001	Question Type	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 6-5 | (1)5-10; SDWA | O. Reg. 170/03 | 6-5 | (1.1);

Question:
Were 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, equipped with alarms or shut-off mechanisms that satisfied the standards described in Schedule 6?

Compliance Response(s)/Corrective Action(s)/Observation(s):
All required continuous monitoring equipment utilized for sampling and testing were equipped with alarms or shut-off mechanisms that satisfied the standards

According to discussions with the Operating Authority and information presented within the Operations and Maintenance Manual and online SCADA at the Treatment Plant, alarms are engaged in the event of unusual activities. The following represent some of the current alarm settings for critical parameters as described by the Operating Authority, but they can change depending on the operating conditions.

1. Final Effluent Low Low Free Chlorine = 0.80 mg/L
2. Final Effluent Low Free Chlorine = 0.90 mg/L
3. Final Effluent High Free Chlorine = 1.95 mg/L
4. Final Effluent High High Free Chlorine = 2.00 mg/L
5. Filter 1 and 2 High Turbidity = 0.25 NTU
6. Filter 1 and 2 High High Turbidity = 0.28 NTU
7. Clearwell /Reservoir Low Low Level = 0.6 m
8. Clearwell /Reservoir Low Level = 0.8 m
9. Clearwell /Reservoir High High Level = 2.50 m
10. Clearwell /Reservoir High Level = 2.45 m

Question ID	DWMR1040001	Question Type	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 6-5 | (1)1-4; SDWA | O. Reg. 170/03 | 6-5 | (1)5-10;

Question:
Were all continuous analysers calibrated, maintained, and operated, in accordance with the manufacturer's instructions or the regulation?

Compliance Response(s)/Corrective Action(s)/Observation(s):
All continuous analysers were calibrated, maintained, and operated as required.

Ontario Regulation 170/03 – Schedule 6-5 stipulates that the following accuracy of the regulatory continuous analyzers must be maintained:

i. In the case of free chlorine residual, 0.05 milligrams per litre, if the concentrations usually measured by the equipment are less than or equal to 1.0 milligrams per litre, and proportionally higher if the concentrations usually measured are greater than 1.0 milligrams per litre,
ii. 0.1 Nephelometric Turbidity Units (NTU), in the case of turbidity.

The Owner oversees the operation and maintenance of the distribution system, and they provided documentation to indicate that the accuracy of their portable chlorine analyzers are verified on a monthly basis.

At the Treatment Plant, the Operating Authority oversees the maintenance and accuracy of the regulatory continuous chlorine and turbidity analyzers. According to logsheets, a comparison of the readings from the online continuous analyzers to portable analyzers is done on a daily basis, and in situations where the difference between the two readings does not meet with the required minimum standard of accuracy, appropriate adjustments are made to the online continuous analyzer(s). The Operating Authority provided annual calibrations / verifications completed on their portable and bench top chlorine and turbidity analyzers dated July 3 and 18, 2024, and provided work order documentation to indicate they complete internal verifications of their portable and bench top meters on a monthly basis.

NOTE: The work order documentation provided by the Operating Authority did not include the actual verification documentation, but rather, just that the verifications were completed. From herein, the Owner / Operating Authority shall ensure the monthly verification documentation is maintained and available for review.

Question ID	DWMR1108001	**Question Type**	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 6-5 | (1)5-10; SDWA | O. Reg. 170/03 | 6-5 | (1.1);

Question:
Where continuous monitoring equipment used for the monitoring of free chlorine residual, total chlorine residual, combined chlorine residual or turbidity, required by O. Reg. 170/03, Municipal Drinking Water Licence, Drinking Water Works Permit, or order triggered an alarm or an automatic shut-off, did a qualified person respond as required and take appropriate actions?

Compliance Response(s)/Corrective Action(s)/Observation(s):
A qualified person responded as required and took appropriate actions.

The Operating Authority advised that during any alarm conditions, the on-call Operator is contacted at which time the SCADA system is immediately assessed to determine the nature of the alarm and the level of response required. In the event of critical alarms, the Operating Authority would dispatch an Operator to the Treatment Plant to conduct corrective actions.

Question ID	DWMR1099001	Question Type	Information

Legislative Requirement(s):
Not Applicable

Question:
Do records show that water provided by the drinking water system met the Ontario Drinking Water Quality Standards?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Records showed that not all water sample results met the Ontario Drinking Water Quality Standards.

Over the course of the inspection period, there was two adverse water quality incident as described below:

1. AWQI # 165323 – Distribution System – Total Coliform = 4 CFU/100 mL (June 24, 2024). Resamples collected on June 25, 2024 and reported as non-adverse

2. AWQI # 166042 – Distribution System – Total Coliform = 1 CFU/100 mL (August 19, 2024). Resamples collected on August 20, 2024 and reported as non-adverse

Question ID	DWMR1079001	Question Type	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 10-4 | (1); SDWA | O. Reg. 170/03 | 10-4 | (2); SDWA | O. Reg. 170/03 | 10-4 | (3);

Question:
Were raw water microbiological sampling requirements prescribed by Schedule 10-4 of O. Reg. 170/03 for large municipal residential systems met?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Raw water microbiological sampling requirements were met.

Ontario Regulation 170/03 – Schedule 10-4 stipulates that raw 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). Generally stated, at least one sample that is taken during a week must be taken at least five days, and not more than 10 days, after a sample was taken for that purpose in the previous week. Testing of the samples collected from the raw water source must include E. coli and total coliforms.

Over the course of the inspection period, the Operating Authority typically collected weekly

raw water samples as prescribed by Ontario Regulation 170/03 – Schedule 10-4. Raw water samples were not collected from November 18 to December 16, 2024 as the Treatment Plant was not operational at this time.

It should also be noted that the Owner / Operating Authority collected and tested raw water samples on a monthly basis for Clostridium Perfringens over the course of the inspection period.

Question ID	DWMR1083001	**Question Type**	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 10-3;

Question:
Were treated microbiological sampling requirements prescribed by Schedule 10-3 of O. Reg. 170/03 for large municipal residential systems met?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Treated microbiological sampling requirements prescribed by Schedule 10-3 of O. Reg. 170/03 were not met.

Corrective Action:

From herein, the Owner / Operating Authority shall ensure that all collected treated water microbiological samples are tested as per the requirements prescribed by Ontario Regulation 170/03 – Schedule 10-3 and include E. coli, total coliforms and general bacteria population expressed as colony counts on a heterotrophic plate count.

Ontario Regulation 170/03 – Schedule 10-3 stipulates that treated 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). Generally stated, at least one sample that is taken during a week must be taken at least five days, and not more than 10 days, after a sample was taken for that purpose in the previous week. Testing of the samples collected from the Treatment Plant must include E. coli, total coliforms and general bacteria population expressed as colony counts on a heterotrophic plate count.

Over the course of the inspection period, the Operating Authority typically collected weekly treated water samples from the Treatment Plant as prescribed by Ontario Regulation 170/03 – Schedule 10-3, with the exception of the period from November 18 to December 23, 2024 when the Treatment Plant was not operational. It should be noted that the treated water sample collected on December 30, 2024 did not include the prescribed test for heterotrophic plate count.

It should also be noted that the Owner / Operating Authority collected and tested treated water samples on a monthly basis for Clostridium Perfringens over the course of the inspection period.

Question ID	DWMR1081001	Question Type	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 10-2 | (1); SDWA | O. Reg. 170/03 | 10-2 | (2); SDWA | O. Reg. 170/03 | 10-2 | (3);

Question:
Were distribution microbiological sampling requirements prescribed by Schedule 10-2 of O. Reg. 170/03 for large municipal residential systems met?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Distribution microbiological sampling requirements were 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). Generally stated, at least one sample that is taken during a week must be taken at least five days, and not more than 10 days, after a sample was taken for that purpose in the previous week. Testing of the samples collected from the distribution system must include E. coli and 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 Essex Distribution system serves a total population of approximately 10400 people. Given this information, a minimum of 18 microbiological samples are required to be collected for testing each month, with at least one sample collected each week. Over the course of the inspection period, the Operating Authority collected at least 20 or more microbiological samples per month for testing which meets with the requirements of Ontario Regulation 170/03 – Schedule 10-2.

Question ID	DWMR1096001	Question Type	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 6-3 | (1);

Question:
Did records confirm that chlorine residual tests were conducted at the same time and location as microbiological samples?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Records confirmed that chlorine residual tests were conducted as required.

Question ID	DWMR1084001	Question Type	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 13-2;

Question:
Were inorganic parameter sampling requirements prescribed by Schedule 13-2 of O. Reg. 170/03 met?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Inorganic parameter sampling requirements were met.

Ontario Regulation 170/03 – Schedule 13-2 stipulates that Schedule 23 Inorganic water quality samples are required to be collected and tested every 12 months within the frequency prescribed by Ontario Regulation 170/03 – Schedule 6-1.1 (5). According to documentation provided for review from the Owner / Operating Authority, the following samples were collected:

1. April 4, 2022
2. May 16, 2023
3. April 3, 2024

Based on the aforementioned tests, the Owner / Operating Authority are in compliance with the requirements for collecting Schedule 23 Inorganic water quality samples as prescribed by Ontario Regulation 170/03 – Schedule 13-2.

Question ID	DWMR1085001	**Question Type**	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 13-4 | (1); SDWA | O. Reg. 170/03 | 13-4 | (2); SDWA | O. Reg. 170/03 | 13-4 | (3);

Question:
Were organic parameter sampling requirements prescribed by Schedule 13-4 of O. Reg. 170/03 met?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Organic parameter sampling requirements were met.

Ontario Regulation 170/03 – Schedule 13-4 stipulates that Schedule 24 Organic water quality samples are required to be collected and tested every 12 months within the frequency prescribed by Ontario Regulation 170/03 – Schedule 6-1.1 (5). According to documentation provided for review from the Owner / Operating Authority, the following samples were collected:

1. April 4, 2022
2. May 16, 2023
3. April 3, 2024

Based on the aforementioned tests, the Owner / Operating Authority are in compliance with the requirements for collecting Schedule 23 Organic water quality samples as prescribed by Ontario Regulation 170/03 Schedule 13-4.

Question ID	DWMR1086001	Question Type	Legislative

Legislative Requirement(s):
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);

Question:
Were haloacetic acid sampling requirements prescribed by Schedule 13-6 of O. Reg. 170/03 met?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Haloacetic acid sampling requirements were met.

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 analysing haloacetic acids became effective on January 1, 2017. Over the course of the inspection period, samples were collected on the following days from the distribution system:

1. April 10, 2023 – HAA = 24.8 ug/L
2. July 5, 2023 – HAA = 6.0 ug/L
3. October 4, 2023 – HAA = <5.3 ug/L
4. January 8, 2024 – HAA = <5.3 ug/L
5. April 3, 2024 – HAA = <5.3 ug/L
6. July 3, 2024 – HAA = 6.7 ug/L
7. October 7, 2024 – HAA = <5.3 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:

$[A + B + C + D] \div 4$

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	DWMR1087001	**Question Type**	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 13-6 | (1); SDWA | O. Reg. 170/03 | 13-6 | (2); SDWA | O. Reg. 170/03 | 13-6 | (3); SDWA | O. Reg. 170/03 | 13-6 | (4); SDWA | O. Reg. 170/03 | 13-6 | (5); SDWA | O. Reg. 170/03 | 13-6 | (6);

Question:
Were trihalomethane sampling requirements prescribed by Schedule 13-6 of O. Reg. 170/03 met?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Trihalomethane sampling requirements were met.

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 10, 2023 – THM = 24.0 ug/L
2. July 5, 2023 – THM = 38.0 ug/L
3. October 4, 2023 – THM = 31.0 ug/L
4. January 8, 2024 – THM = 18.0 ug/L
5. April 3, 2024 – THM = 20.0 ug/L
6. July 3, 2024 – THM = 31.0 ug/L
7. October 7, 2024 – THM = 19.0 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	DWMR1088001	Question Type	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 13-7;

Question:
Were nitrate/nitrite sampling requirements prescribed by Schedule 13-7 of O. Reg. 170/03 met?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Nitrate/nitrite sampling requirements were met.

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). Over the course of the inspection period, the following quarterly samples were collected from the treated water:

1. May 16, 2023
2. July 5, 2023
3. October 4, 2023
4. January 8, 2024
5. April 3, 2024
6. July 3, 2024
7. October 7, 2024

Based on the aforementioned tests, the Owner / Operating Authority are in compliance with the requirements for collecting nitrate and nitrite water quality samples as prescribed by Ontario Regulation 170/03 - Schedule 13-7.

Question ID	DWMR1089001	Question Type	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 13-8;

Question:
Were sodium sampling requirements prescribed by Schedule 13-8 of O. Reg. 170/03 met?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Sodium sampling requirements were met.

Ontario Regulation 170/03 – Schedule 13-8 stipulates that sodium samples are required to be collected and tested every 60 months from the treated water within the required frequency as prescribed by Ontario Regulation 170/03 – Schedule 6-1.1(7). According to the documentation provided for review, the following sodium samples have been collected.

1. April 8, 2020 – Sodium = 9.01 mg/L
2. April 13, 2021 – Sodium = 7.63 mg/L
3. April 4, 2022 – Sodium = 9.75 mg/L
4. May 16, 2023 – Sodium = 7.48 mg/L
5. April 3, 2024 – Sodium = 8.48 mg/L

Based on the aforementioned tests, the Owner / Operating Authority are in compliance with the requirement for collecting sodium water quality samples as prescribed by Ontario Regulation 170/03 – Schedule 13-8.

In addition, three distribution water samples for sodium testing were collected on October 30, 2023.

Question ID	DWMR1090001	**Question Type**	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 13-9;

Question:
Where fluoridation is not practiced, were fluoride sampling requirements prescribed by Schedule 13-9 of O. Reg. 170/03 met?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Fluoride sampling requirements were met.

Ontario Regulation 170/03 – Schedule 13-9 stipulates that fluoride samples are required to be collected and tested every 60 months from the treated water within the required frequency as prescribed by Ontario Regulation 170/03 – Schedule 6-1.1(7). According to the documentation provided for review, the following sodium samples have been collected.

1. April 8, 2020 – Fluoride = 0.09 mg/L
2. April 13, 2021 – Fluoride = 0.06 mg/L
3. April 4, 2022 – Fluoride = 0.06 mg/L
4. May 16, 2023 – Fluoride = 0.06 mg/L
5. April 3, 2024 – Fluoride = 0.06 mg/L

Based on the aforementioned tests, the Owner / Operating Authority are in compliance with the requirement for collecting fluoride water quality samples as prescribed by Ontario Regulation 170/03 – Schedule 13-9.

Question ID	DWMR1092001	**Question Type**	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 6-2;

Question:
Were water samples taken at the prescribed location?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Water samples were taken at the prescribed location.

The Owner / Operating Authority has installed several sampling taps within the Treatment Plant that allow for the collection of samples throughout the complete treatment train. These include the regulatory raw water and final treated water sampling taps, in addition to sample taps for clarifier effluent, filter effluent and reservoir effluent.

Question ID	DWMR1095001	**Question Type**	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 15.1-10; SDWA | O. Reg. 170/03 | 15.1-4 | (1); SDWA | O. Reg. 170/03 | 15.1-5 | (1); SDWA | O. Reg. 170/03 | 15.1-5 | (10); SDWA | O. Reg. 170/03 | 15.1-5 | (11); SDWA | O. Reg. 170/03 | 15.1-5 | (2); SDWA | O. Reg. 170/03 | 15.1-5 | (3); SDWA | O. Reg. 170/03 | 15.1-5 | (4); SDWA | O. Reg. 170/03 | 15.1-5 | (5); SDWA | O. Reg. 170/03 | 15.1-5 | (6); SDWA | O. Reg. 170/03 | 15.1-5 | (7); SDWA | O. Reg. 170/03 | 15.1-5 | (8); SDWA | O. Reg. 170/03 | 15.1-5 | (9); SDWA | O. Reg. 170/03 | 15.1-7 | (1); SDWA | O. Reg. 170/03 | 15.1-7 | (2); SDWA | O. Reg. 170/03 | 15.1-7 | (3); SDWA | O. Reg. 170/03 | 15.1-7 | (4); SDWA | O. Reg. 170/03 | 15.1-9 | (1); SDWA | O. Reg. 170/03 | 15.1-9 | (2); SDWA | O. Reg. 170/03 | 15.1-9 | (3); SDWA | O. Reg. 170/03 | 15.1-9 | (4); SDWA | O. Reg. 170/03 | 15.1-9 | (5); SDWA | O. Reg. 170/03 | 15.1-9 | (6); SDWA | O. Reg. 170/03 | 15.1-9 | (7); SDWA | O. Reg. 170/03 | 15.1-9 | (8); SDWA | O. Reg. 170/03 | 15.1-9 | (9);

Question:
Were lead sampling requirements prescribed by Schedule 15.1 of O. Reg. 170/03 met?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Lead sampling requirements were met.

Over the course of the inspection period, two lead sampling periods occurred. Based on conversations with the Owner / Operating Authority it is understood that the drinking water system qualified for exemption for collection and testing for lead samples from plumbing. In addition, given the current population served by the water system (10400), the reduced sampling table would require 4 distribution samples to be collected each period. The following presents a history of the more recent lead sampling conducted by the Operating Authority as prescribed by the requirements of Ontario Regulation 170/03 – Schedule 15.1-5.

1. December 15, 2021 to April 15, 2022:
   a. 0 Residential Plumbing samples for Lead, Lead and pH
   b. 0 Non Residential Plumbing samples for Lead, Lead and pH
   c. 4+1 Distribution samples for Lead, Alkalinity and pH testing.

2. June 15, 2022 to October 15, 2022:

a. 0 Residential Plumbing samples for Lead, Lead and pH
b. 0 Non Residential Plumbing samples for Lead, Lead and pH
c. 4+4 Distribution samples for Lead, Alkalinity and pH testing.

3. December 15, 2022 to April 15, 2023:
a. 0 Residential Plumbing samples for Lead, Lead and pH
b. 0 Non Residential Plumbing samples for Lead, Lead and pH
c. 4+4 Distribution samples for Lead, Alkalinity and pH testing.

4. June 15, 2023 to October 15, 2023:
a. 0 Residential Plumbing samples for Lead, Lead and pH
b. 0 Non Residential Plumbing samples for Lead, Lead and pH
c. 4+4 Distribution samples for Lead, Alkalinity and pH testing, plus 4 Distribution samples for Alkalinity and pH testing.

5. December 15, 2023 to April 15, 2024:
a. 0 Residential Plumbing samples for Lead, Lead and pH
b. 0 Non Residential Plumbing samples for Lead, Lead and pH
c. 4+1 Distribution samples for Lead, Alkalinity and pH testing.

6. June 15, 2024 to October 15, 2024:
a. 0 Residential Plumbing samples for Lead, Lead and pH
b. 0 Non Residential Plumbing samples for Lead, Lead and pH
c. 4+4 Distribution samples for Lead, Alkalinity and pH testing

According to the results of testing presented above, the Owner / Operating Authority have collected samples for lead, alkalinity and pH testing from the distribution system according to the reduced sampling regime over the inspection period as presented in Ontario Regulation 170/03 – Schedule 15.1-5.

Question ID	DWMR1104001	**Question Type**	Legislative

Legislative Requirement(s):
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);

Question:
Were immediate verbal notification requirements for adverse water quality incidents met?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Immediate verbal notification requirements for adverse water quality incidents were met.

Question ID	DWMR1105001	Question Type	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 16-7 | (1); SDWA | O. Reg. 170/03 | 16-7 | (2); SDWA | O. Reg. 170/03 | 16-7 | (3); SDWA | O. Reg. 170/03 | 16-7 | (4); SDWA | O. Reg. 170/03 | 16-7 | (5);

Question:
Were written notice requirements for adverse water quality incidents met?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Written notice requirements for adverse water quality incidents were met.

Question ID	DWMR1106001	Question Type	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 16-9 | (1); SDWA | O. Reg. 170/03 | 16-9 | (2);

Question:
Were issue resolution notice requirements for adverse water quality incidents met?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Requirements for written notices of issue resolution for adverse water quality incidents were met.

Question ID	DWMR1101001	Question Type	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 17-1; SDWA | O. Reg. 170/03 | 17-10 | (1); 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;

Question:
For large municipal residential systems, were corrective actions, including any steps directed by the Medical Officer of Health, taken to address adverse conditions?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Corrective actions were taken to address adverse conditions.

Question ID	DWMR1110001	Question Type	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 11 | (6);

Question:
Was the annual report prepared by February 28th of the following year and did it contain the required information?

Compliance Response(s)/Corrective Action(s)/Observation(s):
The annual report requirements were met.

All elements of the Annual Report were present within the 2023 report provided for review. In addition, this report was available to the public and posted on the Town of Essex web page under Publications, Plans and Reports.

Question ID	DWMR1057001	Question Type	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 11 | (2.1);

Question:
Did the owner of this system provide an annual report to the owner(s) of all standalone distribution systems connected to this system?

Compliance Response(s)/Corrective Action(s)/Observation(s):
The owner provided an annual report to the standalone distribution system(s) connected to this system.

The Owner / Operating Authority advised that the Essex Harrow-Colchester South drinking water system (WW# 210000130) is interconnected to the Essex Distribution system (WW# 220003680). They advised that a copy of the Annual report is provided

Question ID	DWMR1056001	Question Type	Information

Legislative Requirement(s):
Not Applicable

Question:
Did the donor provide an annual report to the owner of this receiver drinking water system?

Compliance Response(s)/Corrective Action(s)/Observation(s):
The donor provided an annual report to the owner of the receiver drinking water system.

Question ID	DWMR1111001	Question Type	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 22-2 | (1); SDWA | O. Reg. 170/03 | 22-2 | (2); SDWA | O. Reg. 170/03 | 22-2 | (3); SDWA | O. Reg. 170/03 | 22-2 | (4);

Question:
Did the summary report contain the required information and was it completed and distributed as required?

Compliance Response(s)/Corrective Action(s)/Observation(s):
The summary report requirements were met.

Ontario Regulation 170/03 – Schedule 22 stipulates that the Summary Report for a municipal drinking water system must be prepared and given to the Municipality by March 31 and summarize the findings for the previous calendar year including, but not limited to Schedule 22-2.

The Owner / Operating Authority provided the 2023 Summary report which was dated February 23, 2024 for review as part of this inspection. The content of this report met with the requirements prescribed by Ontario Regulation 170/03 – Schedule 22. In addition, the Owner provided council meeting minutes indicating the Annual and Summary reports were accepted on March 18, 2024.

Question ID	DWMR1113001	**Question Type**	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 10.1 | (3);

Question:
Were changes to the system registration information provided to the ministry within ten (10) days of the change?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Changes to the system registration information were not provided within ten (10) days of the change.

Corrective Action:
The Owner / Operating Authority shall forthwith make appropriate modifications to their drinking water works profile information to ensure it is accurate and up to date as prescribed by Ontario Regulation 170/03 – Section 10.1(3). The aforementioned modifications can be emailed to waterforms@ontario.ca. Additionally, the Owner / Operating Authority shall forward the aforementioned modifications to Neville Rising of the Ministry of Environment, Conservation and Parks upon completion.

Ontario Regulation 170/03 – Section 10.1(3) stipulates that if there is any change to the information given to the Director under subsection (1) or (2), the owner of the drinking water system shall give the Director written notice of the change within 10 days of the change.

At the time of the inspection, the population within the profile information for the drinking water system was noted as 7000. Based on the findings of this inspection, it is understood that the current population served by the drinking water system is approximately 10400 people. Accurate population numbers are critical when assessing the appropriate number of microbiological and lead samples to be collected from the drinking water system.

Question ID	DWMR1114001	Question Type	Legislative

Legislative Requirement(s):
SDWA | 31 | (1);

Question:
Did the owner have evidence that, when required, all legal owners associated with the drinking water system were notified of the requirements of the Municipal Drinking Water Licence and Drinking Water Works Permit?

Compliance Response(s)/Corrective Action(s)/Observation(s):
The owner had evidence that the required notifications were made.

The Owner / Operating Authority advised that all legal owners associated with the Drinking Water System were notified of the requirements of the License & Permit through acceptance of the Annual and Summary Report, in addition to mandatory Standard of Care training. The Owner also advised that temporary owners of the drinking water infrastructure, such developers who have not yet transferred assets to the municipality, are provided with the Municipal Drinking Water License and the Drinking Water Works Permit as part of initial construction contracts.

Question ID	DWMR1098001	Question Type	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 13 | (1); SDWA | O. Reg. 170/03 | 13 | (2); SDWA | O. Reg. 170/03 | 13 | (3);

Question:
Were the required records kept for the periods prescribed by section 13 of O. Reg. 170/03?

Compliance Response(s)/Corrective Action(s)/Observation(s):
The required records were kept for the prescribed periods.

The Operating Authority advised that all documentation is maintained as prescribed by Ontario Regulation 170/03 – Section 13.

Question ID	DWMR1043001	Question Type	Legislative

Legislative Requirement(s):
SDWA | 31 | (1);

Question:
Were the process wastewater and residual solids/sludges treated, handled, and disposed of in accordance with the design requirements approved under the Drinking Water Works Permit and the Municipal Drinking Water Licence?

Compliance Response(s)/Corrective Action(s)/Observation(s):
The process wastewater and residual solids/sludges were treated, handled, and disposed of as required.

Drinking Water Works Permit #029-201, Issue #3 lists two earthen sludge settling ponds within Schedule A (Components). These settling ponds receive process wastewater and sludge from the clarifier, and backwash wastewater from filters. Following settling, this water is discharged to the storm water system and eventually to Lake Erie.

The Owner / Operating Authority also advised that when sludge levels within the settling ponds becomes excessive, they excavate sludge from one of the ponds, place it in the adjacent pond for drying, and during this time period, they manage sludge in the single operational settling pond. Once the sludge from the non-operational pond has sufficiently dried, it is tested, removed and directed to the municipal landfill, after which both settling ponds become fully operational again.

Question ID	DWMR1044001	**Question Type**	Legislative

Legislative Requirement(s):
SDWA | 31 | (1);

Question:
Did the process wastewater discharge monitoring program and discharge quality comply with requirements established in the Municipal Drinking Water Licence?

Compliance Response(s)/Corrective Action(s)/Observation(s):
The process wastewater discharge monitoring program and discharge quality complied with the requirements.

Municipal Drinking Water License #029-101, Issue #3, Schedule C, Section 5.3 stipulates that a composite sample of the discharged water from the on-site sludge settling ponds must be taken on the monthly basis from the "Point of Discharge to Lake Erie" and tested for Total Suspended Solids ("TSS"). Section 5.4 of Schedule C indicates that any sampling, testing and monitoring for the parameter Total Suspended Solids shall be performed in accordance with the requirements set out in the publication "Standard Methods for the Examination of Water and Wastewater", 23rd Edition, 2017, or as amended from time to time by more recently published editions. In addition, Schedule C, Section 1.5, Table 3 stipulates that the maximum average annual TSS concentration from the collected monthly discharge samples must not exceed 25 mg/L

Over the course of the inspection period, the Owner / Operating Authority collected monthly composite samples of discharged water from the "Point of Discharge to Lake Erie" for residual TSS analysis as prescribed by Table 7 of Section 5.4. Based on the reported results, the TSS range of sampling was from <2 to 13 mg/L, with an annual average TSS concentration of 3.58 mg/L, which is less than TSS residual limit of 25 mg/L as prescribed by the Standard Methods for the Examination of Water and Wastewater document.

Question ID	DWMR1045001	**Question Type**	Legislative

Legislative Requirement(s):
SDWA | 31 | (1);

Question:
Did the owner update the document describing the distribution components within 12 months of completion of alterations to the system in accordance with the Drinking Water Works Permit?

Compliance Response(s)/Corrective Action(s)/Observation(s):
The owner had up-to-date documents describing the distribution components.

Drinking Water Works Permit # 029-201, Issue #3, Schedule A, Section 1.1 references a watermain drawing for the system dated January 22, 2009. At the time of the inspection, the Owner / Operating Authority provided an updated general map of the distribution system dated September 2022 which identifies the areas where the distribution system is located. In addition, it is understood that the Town of Essex maintains an online (GIS based) mapping system which details the specific location of watermains, hydrants, valves, etc., within the system. The Operating Authority advised that any additions, replacements or modifications to the components of the distribution system are updated within the interactive map as soon as possible once the work has been completed.

The Owner / Operating Authority are reminded that Drinking Water Works Permit # 029-201, Issue #3, Schedule B, Section 3.5 stipulates that any modifications to the Water Master Plan of the distribution system must be made within 12 months of any addition, modification, replacement, or extension.

Question ID	DWMR1046001	**Question Type**	BMP

Legislative Requirement(s):
Not Applicable

Question:
Was there a backflow prevention program, policy and/or bylaw in place that addressed cross connections and connections to high hazard facilities?

Compliance Response(s)/Corrective Action(s)/Observation(s):
There was a backflow prevention program, policy and/or bylaw in place.

On June 4, 2018, the Corporation of the Town of Essex passed By-Law # 1713 also referred to as the Cross Connection Control and Backflow Prevention bylaw which applies to existing industrial, commercial, institutional and multi-residential buildings Generally stated, the bylaw stipulates that cross connections are prohibited, requires installation of backflow prevention devices and prescribes a schedule upon which surveys of buildings are to be conducted for possible cross connections and testing of backflow prevention devices are to be conducted.

Question ID	DWMR1053001	**Question Type**	BMP

Legislative Requirement(s):
Not Applicable

Question:
Was the owner able to maintain proper pressures in the distribution system and was pressure monitored to alert the operator of conditions of loss of pressure below the value under which the system was designed to operate?

Compliance Response(s)/Corrective Action(s)/Observation(s):
The owner was able to maintain proper pressures in the distribution system and pressure was monitored to alert the operator of conditions which may lead to loss of pressure below the value under which the system is designed to operate.

Pressure is continually monitored in the distribution system at the Harrow Water Tower. Pressure is also measured on the treated water exiting the to the distribution system. This configuration of monitoring allows the Operating Authority to maintain pressure adequately. The Owner / Operating Authority aims to maintain the pressure between 50 and 60 pounds per square inch.

Question ID	DWMR1047001	**Question Type**	BMP

Legislative Requirement(s):
Not Applicable

Question:
Did the owner have a program or maintain a schedule for routine cleanout, inspection and maintenance of reservoirs and elevated storage tanks within the distribution system?

Compliance Response(s)/Corrective Action(s)/Observation(s):
The owner had a program or maintained a schedule for routine cleanout, inspection and maintenance of reservoirs and elevated storage tanks within the distribution system.

The Owner / Operating Authority advised that reservoirs and towers are cleaned and inspected every five years. The last inspection and cleaning of the main reservoir is understood to have been conducted in May 2019. More recently, an inspection of the water tower was completed in June 2023 and details related to the inspection were provided in a report titled "Inspection of Elevated Water Tank, Harrow, Ontario" which was prepared by Watech Services Inc. Generally stated, the report indicated the interior of the tank was in good condition and a recommendation to re-inspect the interior of the tower every three years was made.

Question ID	DWMR1048001	**Question Type**	BMP

Legislative Requirement(s):
Not Applicable

Question:
Had the owner implemented a program for the flushing of watermains as per industry standards?

Compliance Response(s)/Corrective Action(s)/Observation(s):
The owner had implemented a program for the flushing of watermains.

The Owner / Operating Authority advised that there is one auto flushing device permanently located within the distribution to facilitate flushing programs. Flushing is understood to typically occur on a monthly basis according to records provided or in response to lower than normal free chlorine levels.

Question ID	DWMR1050001	Question Type	BMP

Legislative Requirement(s):
Not Applicable

Question:
Was there a program in place for inspecting and exercising valves?

Compliance Response(s)/Corrective Action(s)/Observation(s):
There was a program in place for inspecting and exercising valves.

The Owner / Operating Authority advised that although they do not have a formal program for inspecting and exercising valves, these activities are conducted proactively by the Town of Essex. It is recommended that a formal program for inspecting and exercising valves be considered.

Question ID	DWMR1051000	Question Type	BMP

Legislative Requirement(s):
Not Applicable

Question:
Is there a program in place for inspecting and operating hydrants?

Compliance Response(s)/Corrective Action(s)/Observation(s):
There was a program in place for inspecting and operating hydrants.

The Operating Authority advised that inspection and operating hydrants occurs on an annual basis in the fall in conjunction with flushing activities.

Question ID	DWMR1052001	Question Type	BMP

Legislative Requirement(s):
Not Applicable

Question:
Was there a bylaw or policy in place limiting access to hydrants?

Compliance Response(s)/Corrective Action(s)/Observation(s):
There was a bylaw or policy in place limiting access to hydrants.

The Corporation of the Town of Essex By-Law #2303 limits the operation of fire hydrants and other appurtenances in the distribution system to persons authorized by the Water Superintendent or for fire fighting purposes.

Question ID	DWMR1058001	Question Type	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 128/04 | 28;

Question:
Did operators and maintenance personnel have ready access to operations and maintenance manuals?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Operators and maintenance personnel had ready access to operations and maintenance manuals.

The Owner / Operating Authority maintain a hard copy of the Operations and Maintenance Manual within the Treatment Plant where operational staff have access to it.

It is recommended that the Owner / Operating Authority move towards including documentation inclusive of the Operations and Maintenance Manual in a digital format to ensure the most current versions are utilized by operational staff.

Question ID	DWMR1059001	Question Type	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 128/04 | 28;

Question:
Did the operations and maintenance manuals contain plans, drawings, and process descriptions sufficient for the safe and efficient operation of the system?

Compliance Response(s)/Corrective Action(s)/Observation(s):
The operations and maintenance manuals contained plans, drawings, and process descriptions sufficient for the safe and efficient operation of the system.

It is understood that as built plans for the water system are stored at the Treatment Plant and are accessible to the Operating Authority. In addition, the Operating Authority provided a process and instrumentation diagram dated October 2020 which is understood to be representative of the Treatment Plant. Within the Operations and Maintenance Manual there are process narratives describing all levels of treatment at the plant which was updated last on October 17, 2022. In addition, to the aforementioned narratives, the process descriptions associated with the Treatment Plant are supported by detailed SOPs prepared by the Operating Authority.

The distribution mapping system is maintained by the Town of Essex and is understood to be an online system which includes pipe sizes, valves, hydrants, newly installed watermains, etc. Updates to this map are made as soon as possible when there are required changes.

Question ID	DWMR1060001	Question Type	Legislative

Legislative Requirement(s):
SDWA | 31 | (1);

Question:
Did the operations and maintenance manual(s) meet the requirements of the Municipal Drinking Water Licence?

Compliance Response(s)/Corrective Action(s)/Observation(s):
The operations and maintenance manual(s) met the requirements of the Municipal Drinking Water Licence.

The Owner / Operating Authority is reminded that the contents of the Operations and Maintenance Manual must include, at a minimum, all referenced items as prescribed by MDWL #074-101, Issue #5, Schedule B, Section 16.2:

16.2.1 The requirements of this licence and associated procedures;

16.2.2 The requirements of the drinking water works permit for the drinking water system;

16.2.3 A description of the processes used to achieve primary and secondary disinfection within the drinking water system including where applicable:

a) A copy of the CT calculations that were used as the basis for primary disinfection under worst case operating conditions and other operating conditions, if applicable; and
b) The validated operating conditions for UV disinfection equipment, including a copy of the validation certificate;

16.2.4 Procedures for monitoring and recording the in-process parameters necessary for the control of any treatment subsystem and for assessing the performance of the drinking water system;

16.2.5 Procedures for the operation and maintenance of monitoring equipment;

16.2.6 Contingency plans and procedures for the provision of adequate equipment and material to deal with emergencies, upset conditions and equipment breakdown;

16.2.7 Procedures for dealing with complaints related to the drinking water system, including the recording of the nature of the complaint and any investigation and corrective action taken in respect of the complaint;

Question ID	DWMR1064001	Question Type	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 128/04 | 26 | (2);

Question:
Did an operator-in-charge ensure that records were maintained of all adjustments to the

processes within their responsibility?

Compliance Response(s)/Corrective Action(s)/Observation(s):
The operator-in-charge ensured that records were maintained of all adjustments to the processes within their responsibility.

Any adjustments to treatment processes are noted within the daily logsheet entries or the digital logbook system

Question ID	DWMR1062001	Question Type	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 7-5;

Question:
Did records or other record keeping mechanisms confirm that operational testing not performed by continuous monitoring equipment was done by a certified operator, water quality analyst, or person who met the requirements of Schedule 7-5 of O. Reg. 170/03?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Records or other record keeping mechanisms confirmed that operational testing not performed by continuous monitoring equipment was done by a certified operator, water quality analyst, or person who met the requirements of Schedule 7-5 of O. Reg. 170/03.

Question ID	DWMR1063001	Question Type	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 6-10 | (1);

Question:
For every required operational test and sample, was a record made of the date, time, location, results, and name of the person conducting the test?

Compliance Response(s)/Corrective Action(s)/Observation(s):
For every required operational test and sample, a record was made as required.

Question ID	DWMR1061001	Question Type	Legislative

Legislative Requirement(s):
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);

Question:
Were logbooks properly maintained and did they contain the required information?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Logbooks were properly maintained and contained the required information.

Ontario Regulation 128/04 – Section 27(5) prescribes certain minimum requirements for logs / record keeping including:
1. The date, the time of day the shift began and ended and the number or designation of the shift.
2. The names of all operators on duty during the shift.
3. Any departures from normal operating procedures that occurred during the shift and the time they occurred.
4. Any special instructions that were given during the shift to depart from normal operating procedures and the person who gave the instructions.
5. Any unusual or abnormal conditions that were observed in the subsystem during the shift, any action that was taken and any conclusions drawn from the observations.
6. Any equipment that was taken out of service or ceased to operate during the shift and any action taken to maintain or repair equipment during the shift. O. Reg. 128/04, s. 27 (5)

OCWA, who oversees the operations of the Treatment Plant, maintain a digital log keeping system identified as ERIS. Within this digital logbook, the ORO, OIC and OITs (as applicable) are entered in at the beginning of each shift, in addition to duties conducted by the Operating Authority including unusual activities. The Operating Authority also completed daily logsheets of standard activities including but not limited to: influent flow rates, discharge flow rates, free chlorine readings (handheld and online), turbidity readings, chemical dosages, etc. which forms part of the record keeping. It was noted on occasion that when the OIT entered notes to the digital logbook for process related duties at the Treatment Plant, they did not consistently reference that direction was provided by the OIC for these duties. After discussions with the Operating Authority it is understood that the OIC is typically present within the Treatment Plant when these duties are conducted, and in circumstances when they are not present, the OIC and ORO are always available by way of cell phones. In addition, the Operating Authority advised that for routine process changes, OCWA maintains detailed SOPs on these processes and each OIT has been trained on them and can refer to them. In order to avoid future confusion associated with logbook entries made by OITs, it is recommended that they include notes indicating the method in which they received direction in the event they have made any process changes at the Treatment Plant (i.e. "as per conversations with the OIC, as per SOP #, etc.).

The Town of Essex primarily oversees maintenance related activities associated with the distribution system such as watermain repairs, breaks, flushing, etc. They have a system in place which identifies who the ORO and OIC will be for the system, and they share this information with OCWA. Log records associated with the activities of the Town of Essex include designated forms on which pertinent information is stored.

Question ID	DWMR1065001	Question Type	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 128/04 | 27 | (6);

Question:
Were logs and other record keeping mechanisms available for at least five (5) years?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Logs or other record keeping mechanisms were available for at least five (5) years.

Question ID	DWMR1066001	Question Type	BMP

Legislative Requirement(s):
Not Applicable

Question:
Was spill containment provided for process chemicals and standby power generator fuel?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Spill containment was provided for process chemicals and/or standby power generator fuel.

Liquid sodium hypochlorite is seasonally used and stored within a dedicated container located within a room in the low lift building that is considered to have spill containment and no drains. Within the Treatment Plant building, various chemicals are used as part of the treatment processes. Chlorine gas is stored within a designated room in which a detector is present to alarm of any possible spill. Powdered activated carbon is also stored within a designated room in the Treatment Plant and given its solid state, it is unlikely to represent a significant concern related to spills. Coagulant is stored within a day tank and a larger storage tank in an area of the Treatment Plant that is fitted with secondary containment.

There are two permanent standby generators used at the Drinking Water System. At the low lift building, the generator includes a ground mounted, 791 litre double hulled diesel fuel storage tank complete with an electronic leak detection system. Within the Treatment Plant, there is a generator and double hulled, steel diesel fuel storage tank that is fitted with a interstitial vacuum pressure gauge to advise of a possible breach between the inner and outer hulls.

Over the course of the inspection period, the Owner / Operating Authority advised that there were no spill events, and there were no signs of staining indicative of spills.

Question ID	DWMR1067001	Question Type	BMP

Legislative Requirement(s):
Not Applicable

Question:
Were equipment and materials in place for the clean up of spills?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Equipment and materials were in place for the clean up of spills.

The Operating Authority advised a spill kit is present within the Treatment Plant.

Question ID	DWMR1068001	**Question Type**	BMP

Legislative Requirement(s):
Not Applicable

Question:
If available, were standby power generators tested under normal load conditions?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Standby power generators were tested under normal load conditions.

Adjacent to the low lift building, there is a diesel powered back up generator that is used to provide power to the low lift building and associated pumps and equipment. Located within the Treatment Plant, there is another diesel powered generator which can supply power to the components of the Treatment Plant during power outages. The Operating Authority advised that these generators are checked annually by a contractor and tested monthly under full load conditions.

Question ID	DWMR1069001	**Question Type**	BMP

Legislative Requirement(s):
Not Applicable

Question:
Were all storage facilities completely covered and secure?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Storage facilities were not completely covered and secure.

Best Management Practices:

It is recommended that the Owner / Operating Authority install appropriate seals on all hatches as a means of protecting the finished treated water as prescribed by the general requirements of Section 7 of the Ten States Standards (2012 Edition).

The outdoor hatches associated with the reservoirs / clearwells were fitted with locks at the time of the inspection. The pump well hatches within the Treatment Plant were not locked but are considered to be secure as they are within the confines of the Treatment Plant building. Seals were not observed to be present on the outdoor or indoor hatch covers, and on the indoor hatches, handles were not present on the access covers which could provide potential exposure routes to the treated water.

Question ID	DWMR1070001	Question Type	BMP

Legislative Requirement(s):
Not Applicable

Question:
Were air vents and overflows associated with reservoirs and elevated storage structures equipped with screens?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Air vents and overflows associated with reservoirs and elevated storage structures were not equipped with screens.

Best Management Practice:

It is recommended that the Owner / Operating Authority assess the Tower's overflow pipe to determine if it is fitted with an appropriate screen. In the event a screen is present it is recommended that this screen be consistent with those recommended in Section 7.07 of the Ten States Standards (2012 Edition). In the event a screen is not present, it is recommended one be installed (or an acceptable alternative) as recommended in Section 7.07 of the Ten States Standards (2012 Edition).

The reservoir / clearwell vents associated with the Treatment Plant were fitted with a combination of a larger steel mesh, and smaller fine mesh to mitigate the entry of foreign material and / or invertebrates.

The Owner / Operating Authority advised that an inspection of the water tower was completed in June 2023 and provided a report titled "Inspection of Elevated Water Tank, Harrow, Ontario" which was prepared by Watech Services Inc. This report indicated that the roof vent on the top of the tower was in good condition. The report also indicated that the overflow pipe was in good condition, but it did not reference whether or not it was fitted with a screen to mitigate possible entry of foreign material and / or invertebrates. At the time of the inspection the overflow was noted to be underneath metal grates and was not able to be assessed for a suitable screen. In addition, a drawing of the tower provided by the Operating Authority did not indicate the presence of a screen associated with the overflow pipe.

Question ID	DWMR1071001	Question Type	BMP

Legislative Requirement(s):
Not Applicable

Question:
Did the owner provide security measures to protect components of the drinking water system?

Compliance Response(s)/Corrective Action(s)/Observation(s):
The owner provided security measures to protect components of the drinking water system.

The Low Lift building and Treatment Plant are locked at all times and equipped with alarms and a dialer system to notify the Owner / Operating Authority of any unauthorized entry. In addition, these components are visited on a daily basis and have security fencing around their perimeters.

The Water Tower has locked security fencing around its perimeter, and it is visited at least on a weekly basis. There are no outbuildings associated with the tower, but there is a locked underground chamber within which there is access piping and various gauges.

The Owner / Operating Authority advised that their SCADA system is protected by way of a VPN and access to it requires usernames and passwords which are periodically changed. Training with regards to cyber security is provided on an annual basis.

Question ID	DWMR1072001	**Question Type**	BMP

Legislative Requirement(s):
Not Applicable

Question:
Had the owner and/or operating authority undertaken efforts to promote water conservation and reduce water losses in the drinking water system?

Compliance Response(s)/Corrective Action(s)/Observation(s):
The owner and/or operating authority undertook efforts to promote water conservation and reduce water losses in their system.

The Corporation of the Town of Essex By-Law #485 limits the use of water for the purpose of watering or irrigating any lawn or garden to every other day from 5:00 am to 8:00 am and 6:00 pm to 12:00 am during the summer months to ensure there is sufficient water to provide for the essential needs of municipal water users.

The Owner / Operating Authority advised that they have recently installed billing meters for the users of the system, and they expect this may result in inadvertent water conservation. They also advised that they do have a leak detection device, and although there is no active leak detection program, they can utilize it as deemed necessary.

Question ID	DWMR1073001	**Question Type**	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 128/04 | 23 | (1);

Question:
Was an overall responsible operator designated for all subsystems which comprise the drinking water system?

Compliance Response(s)/Corrective Action(s)/Observation(s):
An overall responsible operator was designated for all subsystem.

The Essex Harrow - Colchester South drinking water system has two classifications including:

1. The Corporation of the Town of Essex Harrow - Colchester Distribution System – Water Distribution Class 1 (Certificate # 3500, July 14, 2005).
2. Town of Essex Harrow - Colchester South Water Treatment Plant – Water Treatment Subsystem Class 3 (Certificate # 113, December 12, 2005)

According to the discussions with the Owner / Operating Authority, maintenance activities, watermain installations, etc., within the distribution system are overseen by the Town of Essex operational staff who have a designated Overall Responsible Operator ("ORO"). The Town of Essex also has additional Operators with the appropriate certification to cover ORO duties in the event of absence.

In addition, the Ontario Clean Water Agency ("OCWA") oversee the operations with the Treatment Plant and they rotate two appropriately certified Operators as their OROs to account for unforeseen absences. The Operating Authority advised that the OROs are always available by way of cell phones.

Question ID	DWMR1074001	**Question Type**	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 128/04 | 25 | (1);

Question:
Were operators-in-charge designated for all subsystems which comprise the drinking water system?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Operators-in-charge were designated for all subsystems.

OCWA, who oversee the operations at the Treatment Plant utilize the ERIS logbook system within which the OIC is designated each day.

In addition, the Town of Essex, who oversee aspects of the distribution system, utilize a memo system within which the OIC is identified. This system is shared with OCWA.

Question ID	DWMR1075001	**Question Type**	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 128/04 | 22;

Question:
Were all operators certified as required?

Compliance Response(s)/Corrective Action(s)/Observation(s):
All operators were certified as required.

Question ID	DWMR1076001	Question Type	Legislative

Legislative Requirement(s):
SDWA | O. Reg. 170/03 | 1-2 | (2);

Question:
Were adjustments to the treatment equipment only made by certified operators?

Compliance Response(s)/Corrective Action(s)/Observation(s):
Adjustments to the treatment equipment were only made by certified operators.

All staff who make adjustments to the treatment equipment are certified operators. It is was noted on occasion that when the OIT entered notes to the digital logbook for process related duties at the Treatment Plant, they did not consistently reference that direction was provided by the OIC for these duties. After discussions with the Operating Authority it is understood that the OIC is typically present within the Treatment Plant when these duties are conducted, and in circumstances when they are not present, the OIC and ORO are always available by way of cell phones. In addition, the Operating Authority advised that for routine process changes, OCWA maintains detailed SOPs on these processes and each OIT has been trained on them and can refer to them.

Question ID	DWMR1117001	Question Type	Information

Legislative Requirement(s):
Not Applicable

Question:
Were there any other items related to the drinking water system that should be recognized in the report?

Compliance Response(s)/Corrective Action(s)/Observation(s):
The following items were noted as being relevant to the drinking water system:

1. The majority of documentation provided as part of this inspection was available as hard copies (paper) stored within designated binders. This included but was not limited to turbidity and chlorine trend curves, laboratory testing results, daily operational logsheets, daily reports, the Operations and Maintenance Manual, etc. Storage of documentation in hard copy form can present possible problems related to damaged or lost files and information becoming out of date. In addition, the review of hard copy documentation can often result in difficulties identifying the location of pertinent information as part of the inspection review process.

2. It was noted on occasion that when the OIT entered notes to the digital logbook for process related duties at the Treatment Plant, they did not consistently reference that

direction was provided by the OIC for these duties. After discussions with the Operating Authority it is understood that the OIC is typically present within the Treatment Plant when these duties are conducted, and in circumstances when they are not present, the OIC and ORO are always available by way of cell phones. In addition, the Operating Authority advised that for routine process changes, OCWA maintains detailed SOPs on these processes and each OIT has been trained on them and can refer to them.

Best Management Practices:

1. In addition to their standard process, it is strongly recommended that the Owner / Operating Authority move towards maintaining digital documentation that is accessible to their operational staff and available as part of the annual inspection process. This could involve scanning of documentation to enable long term storage and ease of access, developing spreadsheets to store data, and developing an Operations and Maintenance Manual that is accessible to staff. Digital documentation is easy to amend, and results in consistent and up to date, searchable documents to aid in the overall operation of the drinking water system.

2. In order to avoid future confusion and promote compliance with Ontario Regulation 128/04 – Section 27(5) associated with logbook entries made by OITs, it is recommended that they include notes indicating the method in which they received direction in the event they have made any process changes at the Treatment Plant (i.e. "as per conversations with the OIC, as per SOP #, etc.).

Stakeholder References

February 2, 2023

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 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/page/drinking-water

Click on the publication below to access it

- Drinking Water System Profile Information Form - 012-2149E
- Laboratory Services Notification Form – 012-2148E
- Adverse Test Result Notification Form – 012-4444E
- Taking Care of Your Drinking Water: A Guide for Members of Municipal Councils
- Procedure for Disinfection of Drinking Water in Ontario
- Strategies for Minimizing the Disinfection Products Trihalomethanes and Haloacetic Acids
- Filtration Processes Technical Bulletin
- Ultraviolet Disinfection Technical Bulletin
- Guide for Applying for Drinking Water Works Permit Amendments, & License Amendments
- Certification Guide for Operators and Water Quality Analysts
- Training Requirements for Drinking Water Operator
- Community Sampling and Testing for Lead: Standard and Reduced Sampling and Eligibility for Exemption
- Drinking Water System Contact List – 7128E01
- Ontario's Drinking Water Quality Management Standard - Pocket Guide
- 2020 Watermain Disinfection Procedure
- List of Licensed Laboratories

Inspection Rating Record and Inspection Risk Methodology

APPLICATION OF THE RISK METHODOLOGY USED FOR MEASURING MUNICIPAL RESIDENTIAL DRINKING WATER SYSTEM INSPECTION RESULTS

The Ministry of the Environment (MOE) has a rigorous and comprehensive inspection program for municipal residential drinking water systems (MRDWS). Its objective is to determine the compliance of MRDWS with requirements under the Safe Drinking Water Act and associated regulations. It is the responsibility of the municipal residential drinking water system owner to ensure their drinking water systems are in compliance with all applicable legal requirements.

This document describes the risk rating methodology, which has been applied to the findings of the Ministry's MRDWS inspection results since fiscal year 2008-09. The primary goals of this assessment are to encourage ongoing improvement of these systems and to establish a way to measure this progress.

MOE reviews the risk rating methodology every three years.

The Ministry's Municipal Residential Drinking Water Inspection Protocol contains up to 14 inspection modules and consists of approximately 120 regulatory questions. Those protocol questions are also linked to definitive guidance that ministry inspectors use when conducting MRDWS inspections.

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The questions address a wide range of regulatory issues, from administrative procedures to drinking water quality monitoring. The inspection protocol also contains a number of non-regulatory questions.

A team of drinking water specialists in the ministry assessed each of the inspection protocol regulatory questions to determine the risk (not complying with the regulation) to the delivery of safe drinking water. This assessment was based on established provincial risk assessment principles, with each question receiving a risk rating referred to as the Question Risk Rating. Based on the number of areas where a system is deemed to be non-compliant during the inspection, and the significance of these areas to administrative, environmental, and health consequences, a risk-based inspection rating is calculated by the ministry for each drinking water system.

It is important to be aware that an inspection rating less than 100 per cent does not mean the drinking water from the system is unsafe. It shows areas where a system's operation can improve. The ministry works with owners and operators of systems to make sure they know what they need to do to achieve full compliance.

The inspection rating reflects the inspection results of the specific drinking water system for the reporting year. Since the methodology is applied consistently over a period of years, it serves as a comparative measure both provincially and in relation to the individual system. Both the drinking water system and the public are able to track the performance over time, which encourages continuous improvement and allows systems to identify specific areas requiring attention.

The ministry's annual inspection program is an important aspect of our drinking water safety net. The ministry and its partners share a common commitment to excellence and we continue to work toward the goal of 100 per cent regulatory compliance.

Determining Potential to Compromise the Delivery of Safe Water

The risk management approach used for MRDWS is aligned with the Government of Ontario's Risk Management Framework. Risk management is a systematic approach to identifying potential hazards, understanding the likelihood and consequences of the hazards, and taking steps to reduce their risk if necessary and as appropriate.

The Risk Management Framework provides a formula to be used in the determination of risk:

RISK = LIKELIHOOD × CONSEQUENCE
(of the consequence)

Every regulatory question in the inspection protocol possesses a likelihood value (L) for an assigned consequence value (C) as described in **Table 1** and **Table 2**.

TABLE 1:

Likelihood of Consequence Occurring	Likelihood Value
0% - 0.99% (Possible but Highly Unlikely)	L = 0
1 – 10% (Unlikely)	L = 1
11 – 49% (Possible)	L = 2
50 – 89% (Likely)	L = 3
90 – 100% (Almost Certain)	L = 4

TABLE 2:

Consequence	Consequence Value
Medium Administrative Consequence	C = 1
Major Administrative Consequence	C = 2
Minor Environmental Consequence	C = 3
Minor Health Consequence	C = 4
Medium Environmental Consequence	C = 5
Major Environmental Consequence	C = 6
Medium Health Consequence	C = 7
Major Health Consequence	C = 8

The consequence values (0 through 8) are selected to align with other risk-based programs and projects currently under development or in use within the ministry as outlined in **Table 2**.

The Question Risk Rating for each regulatory inspection question is derived from an evaluation of every identified consequence and its corresponding likelihood of occurrence:

- All levels of consequence are evaluated for their potential to occur
- Greatest of all the combinations is selected.

The Question Risk Rating quantifies the risk of non-compliance of each question relative to the others. Questions with higher values are those with a potentially more significant impact on drinking water safety and a higher likelihood of occurrence. The highest possible value would be 32 (4×8) and the lowest would be 0 (0×1).

Table 3 presents a sample question showing the risk rating determination process.

TABLE 3:

Does the Operator in Charge ensure that the equipment and processes are monitored, inspected and evaluated?							
Risk = Likelihood × Consequence							
C=1	C=2	C=3	C=4	C=5	C=6	C=7	C=8
Medium Administrative Consequence	**Major** Administrative Consequence	**Minor** Environmental Consequence	**Minor** Health Consequence	**Medium** Environmental Consequence	**Major** Environmental Consequence	**Medium** Health Consequence	**Major** Health Consequence
L=4 (Almost Certain)	L=1 (Unlikely	L=2 (Possible)	L=3 (Likely)	L=3 (Likely)	L=1 (Unlikely	L=3 (Likely)	L=2 (Possible)
R=4	**R=2**	**R=6**	**R=12**	**R=15**	**R=6**	**R=21**	**R=16**

Application of the Methodology to Inspection Results

Based on the results of a MRDWS inspection, an overall inspection risk rating is calculated. During an inspection, inspectors answer the questions related to regulatory compliance and input their "yes", "no" or "not applicable" responses into the Ministry's Laboratory and Waterworks Inspection System (LWIS) database. A "no" response indicates non-compliance. The maximum number of regulatory questions asked by an inspector varies by: system (i.e., distribution, stand-alone); type of inspection (i.e., focused, detailed); and source type (i.e., groundwater, surface water).

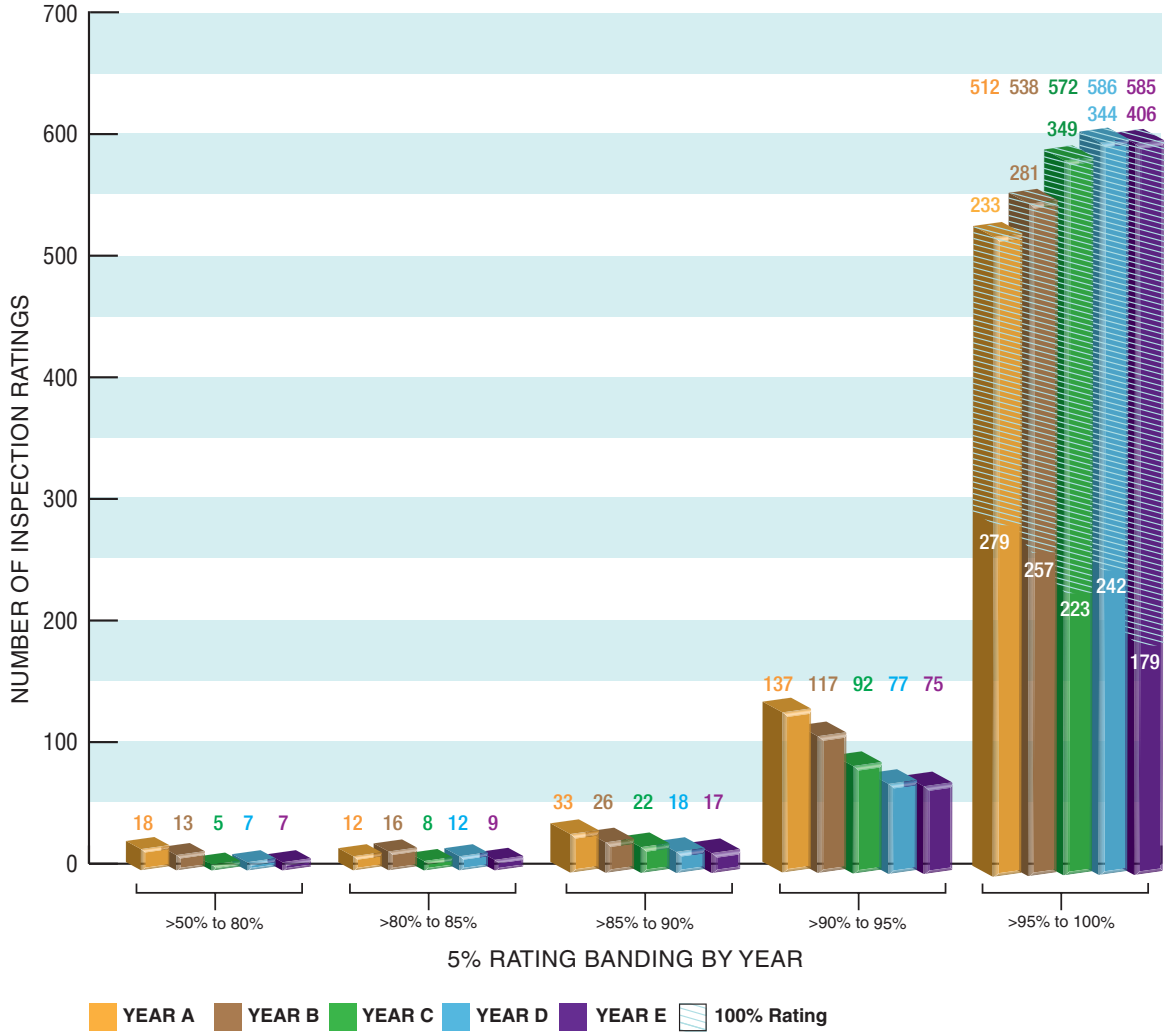
The risk ratings of all non-compliant answers are summed and divided by the sum of the risk ratings of all questions asked (maximum question rating). The resulting inspection risk rating (as a percentage) is subtracted from 100 per cent to arrive at the final inspection rating.

Application of the Methodology for Public Reporting

The individual MRDWS Total Inspection Ratings are published with the ministry's Chief Drinking Water Inspector's Annual Report.

Figure 1 presents the distribution of MRDWS ratings for a sample of annual inspections. Individual drinking water systems can compare against all the other inspected facilities over a period of inspection years.

Figure 1: Year Over Year Distribution of MRDWS Ratings



Reporting Results to MRDWS Owners/Operators

A summary of inspection findings for each system is generated in the form of an Inspection Rating Record (IRR). The findings are grouped into the 14 possible modules of the inspection protocol, which would provide the system owner/operator with information on the areas where they need to improve. The 14 modules are:

1. Source
2. Permit to Take Water
3. Capacity Assessment
4. Treatment Processes
5. Process Wastewater
6. Distribution System
7. Operations Manuals
8. Logbooks
9. Contingency and Emergency Planning
10. Consumer Relations
11. Certification and Training
12. Water Quality Monitoring
13. Reporting, Notification and Corrective Actions
14. Other Inspection Findings

For further information, please visit **www.ontario.ca/drinkingwater**

DWS Name:	ESSEX DRINKING WATER SYSTEM (HARROW-COLCHESTER SOUTH)
DWS Number:	210000130
DWS Owner:	THE CORPORATION OF THE TOWN OF ESSEX
Municipal Location:	ESSEX
Regulation:	O.REG. 170/03
DWS Category:	DW Municipal Residential
Type of Inspection:	Detailed
Compliance Assessment Start Date:	Feb-3-2025
Ministry Office:	Windsor Area Office

Maximum Risk Rating: 658

Inspection Module	Non Compliance Risk (X out of Y)
Capacity Assessment	0/38
Certification and Training	0/42
Distribution System	0/8
Effluent Quality and Quantity	0/20
Logbooks	0/30
Operations Manuals	0/42
Reporting & Corrective Actions	4/92
Source	0/12
Treatment Processes	21/238
Water Quality Monitoring	21/136
Overall - Calculated	**46/658**

Inspection Risk Rating:	**6.99%**

Final Inspection Rating:	**93.01%**

DWS Name:	ESSEX DRINKING WATER SYSTEM (HARROW-COLCHESTER SOUTH)
DWS Number:	210000130
DWS Owner Name:	THE CORPORATION OF THE TOWN OF ESSEX
Municipal Location:	ESSEX
Regulation:	O.REG. 170/03
DWS Category:	DW Municipal Residential
Type of Inspection:	Detailed
Compliance Assessment Start Date:	Feb-3-2025
Ministry Office:	Windsor Area Office

Non-Compliance Question(s)	Non Compliance Risk
Reporting & Corrective Actions	
Were changes to the system registration information provided to the ministry within ten (10) days of the change?	4
Treatment Processes	
Was continuous monitoring equipment that was being utilized to fulfill O. Reg. 170/03 requirements performing tests for the parameters with at least the minimum frequency and recording data with the prescribed format?	21
Water Quality Monitoring	
Were treated microbiological sampling requirements prescribed by Schedule 10-3 of O. Reg. 170/03 for large municipal residential systems met?	21
Overall - Total	**46**

Maximum Question Rating: 658

Inspection Risk Rating:	**6.99%**
FINAL INSPECTION RATING:	**93.01%**