Nova Scotia Environment & Climate Change

System Assessment Report
Terms of Reference Checklist

NOVA SCOTIA

PART I
Introduction

This checklist was prepared as a companion document to the Terms of Reference for System Assessment Reports for Municipal Drinking Water Systems, 2022. For detailed information on each of the submission requirements below, please consult the source document. For ease of reference, reports should follow the format and sequence of the checklist below. Where possible, section references should follow section and sub-section numbering conventions used in the checklist.

Where data is required to be submitted for "the most recent calendar year", Approval Holders may submit 12 consecutive months of data within a 2-year period from the date the system assessment report is due.

PART II
Characterization of the Water Source

2.0 Source Water Characterization

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.	Yes	N/A	Section	Page #
2.1 Source Description and Schematic*				
i. Describe the water source(s) used to meet water consumption demand.	☐	☐		
ii. Describe any sources that are used as back-up supplies.	☐	☐		
iii. Identify sources on a map.	☐	☐		
iv. Document what precautions are required for back-up supplies.	☐	☐		
v. If a back-up supply is intended to be used without precautions, verify that it meets the Nova Scotia Treatment Standards for Municipal Drinking Water Systems or if the back-up supply is connected to an adjoining municipality, document the name of the Municipal Public Drinking Water Supply to which it is connected.	☐	☐		
vi. For Municipal Public Drinking Water Supplies that purchase water from an adjoining system, identify system connections on a map.	☐	☐		
vii. Document the name of the municipal public drinking water supply(s) that water is purchased from and proceed to section 2.3.	☐	☐		

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.	Yes	N/A	Section	Page #
2.2 Microbial Risks				
2.2.1 Surface Water Sources				
i. Summarize microbial risks and water quality variability of the surface water source(s).	☐	☐		
ii. Submit raw water quality data for total coliforms and E. coli, as well as Cryptosporidium and Giardia if available, for the most recent calendar year as an Appendix.	☐	☐		
2.2.2 Groundwater Sources				
i. Verify that all individual wells have been classified in accordance with the Protocol for Determining Groundwater Under the Direct Influence of Surface Water.	☐	☐		
ii. Summarize the GUDI status by individual well and identify at which step in the GUDI Protocol the well was categorized as GUDI or non-GUDI.	☐	☐		
iii. For wells that are no longer in use, identify if the well has been properly decommissioned or is being maintained as a back-up well or monitoring well.	☐	☐		
iv. For GUDI wells, complete Table A.1 and verify that the GUDI classification has not changed based on the results of microscopic particulate analysis (MPA) testing required every two years.	☐	☐		
v. Verify that MPA samples were taken following a rainfall event in accordance with Step 3 of the GUDI Protocol (e.g., if there is a 15-day time-of-travel, then the well shall be sampled 15 days after a surface water event).	☐	☐		
vi. Inspect the site(s) to verify that there are no changes to the surrounding area to warrant re-classification of the well(s).	☐	☐		

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.	Yes	N/A	Section	Page #
vii. Recommend corrective action for wells: • For which MPA test results indicate a change in GUDI classification. • Where changes to the surrounding area have occurred to warrant re-classification of the well per the GUDI Protocol. • Where any other concerns are identified.	☐	☐		
viii. Submit raw water quality data for total coliforms and E. coli bacteria for the most recent calendar year as an Appendix.	☐	☐		
ix. For GUDI wells, submit any raw water quality data for Cryptosporidium or Giardia (if available) for the most recent calendar year as an Appendix.	☐	☐		

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.	Yes	N/A	Section	Page #
2.3 Chemical Risks				
2.3.1 Disinfection By-Products				
a) Trihalomethanes (THMs)				
i. Complete Table A.2 to summarize quarterly THM concentrations by sampling location.	☐	☐		
ii. For non-GUDI systems that have had quarterly sampling reduced to annual sampling: • Note the acceptance date for this reduction in sampling frequency. • Modify Table A.2 to summarize annual results, including sampling date.	☐	☐		
iii. If the locational running annual average for any sampling location exceeds the maximum acceptable concentration, recommend corrective actions.	☐	☐		
iv. Verify that sampling locations are appropriate as follows: • Are samples collected at the point(s) in the distribution system with the highest potential THM concentrations? • Are an adequate number of sites sampled to represent exposure levels system-wide?	☐	☐		
v. Identify THM sampling locations on a map of the distribution system.	☐	☐		
vi. Recommend sampling location/frequency changes if necessary.	☐	☐		
b) Haloacetic Acids (HAA5)				

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.	Yes	N/A	Section	Page #
i. Complete Table A.3 to summarize HAA5 concentrations by sampling location.	☐	☐		
ii. For non-GUDI systems that have had quarterly sampling reduced to annual sampling: • Note the acceptance date for this reduction in sampling frequency. • Modify Table A.3 to summarize annual results, including sampling date.	☐	☐		
iii. If the locational running annual average for any sampling location exceeds the maximum acceptable concentration, recommend corrective actions.	☐	☐		
iv. Verify that sampling locations are appropriate as follows: • Are samples collected at the location(s) where historical data show the highest HAA5 concentrations? If historical data are not available, are HAA5 concentrations monitored in the middle and extremities of the distribution system to determine the highest concentrations? • Are samples collected in areas where disinfectant residuals are significantly lower than the system average because of long residence time? • In systems with booster chlorination stations and water tanks/reservoirs, are HAA5 concentrations monitored downstream of these components? • Are an adequate number of sites sampled to represent system-wide exposure levels?	☐	☐		
v. Identify HAA5 sampling locations on a map of the distribution system.	☐	☐		
vi. Recommend sampling location/frequency changes if necessary.	☐	☐		

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.	Yes	N/A	Section	Page #
c) Other Disinfection By-Products (DBPs)				
i. Identify which other DBPs are required to be monitored and compare this to existing monitoring (see Table 1 in the Terms of Reference).	☐	☐		
ii. Verify that sampling locations are appropriate.	☐	☐		
iii. Identify sampling locations on a map of the distribution system.	☐	☐		
iv. Recommend sampling location/frequency changes if necessary.	☐	☐		
v. Summarize concentrations for the most recent calendar year as an Appendix.	☐	☐		
vi. Recommend corrective actions if any maximum acceptable concentration is exceeded.	☐	☐		
2.3.2 Lead and Corrosion Control				
a) Lead and Copper				

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.	Yes	N/A	Section	Page #
i. Verify that sampling locations and frequencies for lead are appropriate as follows: • Does the residential sampling program meet the minimum requirements as outlined in the Lead and Copper Management Requirements – Municipal Public Drinking Water Supplies or as otherwise accepted by the Department? • Are residences suspected to be at the highest risk for lead targeted in the residential sampling program?	☐	☐		
ii. Recommend sampling location/frequency changes if necessary.	☐	☐		
iii. Summarize and append lead and copper concentrations by sampling location and sample protocol used for the most recent calendar year.	☐	☐		
iv. Summarize corrective actions taken when residential sample results exceeded the maximum acceptable concentration, as outlined in the Lead and Copper Management Requirements – Municipal Public Drinking Water Supplies. • Are the corrective actions taken in line with the minimum requirements outlined in the Lead and Copper Management Requirements – Municipal Public Drinking Water Supplies or as otherwise accepted by the Department?	☐	☐		
v. Recommend program improvements, where applicable.	☐	☐		
b) Corrosion Control				
i. Review the corrosion control program: • Does one exist?	☐	☐		
• Does it include the minimum monitoring requirements as outlined in the Guidelines for Monitoring Public Drinking Water Supplies – Part 1?	☐	☐		

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.	Yes	N/A	Section	Page #
• Does it include action limits for the corrosion monitoring parameters that trigger follow-up?	☐	☐		
ii. Summarize the water quality results of the corrosion control program for the most recent calendar year as an Appendix.	☐	☐		
iii. Recommend corrective actions if concerns are identified from the review of the corrosion control program.	☐	☐		
iv. If a corrosion control program does not exist, document why, including water quality results that demonstrate non-corrosivity of the water, or recommend the need for a more comprehensive corrosion control program. Note: The Langelier Index is no longer considered an adequate measure of corrosivity. The submission of water quality results based solely on a positive Langelier Index will not be accepted as justification for not having a corrosion control program. Note: The Engineer is not required to develop a corrosion control program as part of the System Assessment Report.	☐	☐		
2.3.3 Guidelines for Canadian Drinking Water Quality* *Municipalities that only distribute water purchased from another Municipal Public Drinking Water Supply may obtain water quality results from the Approval Holder of the Municipal Public Drinking Water Supply that treats the water.				
i. Verify that the full suite of health-related parameters (see Table A.4 in the Terms of Reference) has been analyzed a minimum of once every five years for all raw water sources and treated water and document sampling dates.	☐	☐		
ii. Review the data to: • Verify that sampling locations and frequencies are appropriate for cyanobacterial toxins and pesticides. • Identify if any maximum acceptable concentrations (MACs) have been exceeded. • Identify parameters with detectable concentrations.	☐	☐		

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.	Yes	N/A	Section	Page #
iii. Discuss any trends for parameters with detectable concentrations.	☐	☐		
iv. Include laboratory results from the last round of sampling as an Appendix.	☐	☐		
v. Identify when the next round of sampling is scheduled to occur.	☐	☐		
vi. Recommend corrective actions if any MACs are exceeded.	☐	☐		
vii. Recommend any changes to the monitoring program (frequency/location) if sampling is inappropriate for cyanobacterial toxins, pesticides or other parameters with enhanced monitoring that was recommended for parameters with detectable concentrations.	☐	☐		
2.3.4 Guidelines for Monitoring Public Drinking Water Supplies				
i. Verify that the parameters in the Guidelines for Monitoring Public Drinking Water Supplies (see Table A.5) have been analyzed as required in all raw water sources and treated water and document the sampling dates.	☐	☐		
ii. Review the data to: • Verify that sampling locations and frequencies are appropriate. • Identify if any maximum acceptable concentrations (MACs) have been exceeded. • Identify any aesthetic parameters that may compromise disinfection or other critical processes.	☐	☐		
iii. Discuss any water quality trends.	☐	☐		

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.	Yes	N/A	Section	Page #
iv. Include laboratory results from the last round of sampling as an Appendix.	☐	☐		
v. Identify when the next round of sampling is scheduled to occur.	☐	☐		
vi. If any MACs are exceeded, recommend corrective actions.	☐	☐		
vii. Recommend any changes to the monitoring program, sampling location/frequencies if necessary.	☐	☐		
2.3.5 Source Water Protection Plan Monitoring* *This section is not applicable for municipalities that only distribute water purchased from another Municipal Public Drinking Water Supply.				
i. For Approval Holders monitoring any other chemical parameters for source water protection purposes, summarize the parameters, their sampling frequency, and their measured concentrations.	☐	☐		
ii. Recommend corrective actions if concentrations are detectable or increasing.	☐	☐		
iii. Review the source water protection plan monitoring program: • Does one exist? • Does it include monitoring of parameters that provide the information that is needed to evaluate the effectiveness of the source water protection plan?	☐	☐		

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.	Yes	N/A	Section	Page #
2.3.6 Cyanobacteria* *This section is only applicable to surface water sources.				
i. Identify whether the source of supply has been impacted by cyanobacterial blooms.	☐	☐		
ii. Summarize and append any results for cyanobacterial blooms through visual observation and/or confirmation from laboratory results including dates.	☐	☐		
iii. Discuss any corrective actions taken when cyanobacteria have been detected in the source water.	☐	☐		
iv. Discuss the treatment capability of the facility to remove microcystin toxins and identify any vulnerabilities.	☐	☐		
v. Provide recommendations if necessary.	☐	☐		

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.	Yes	N/A	Section	Page #
2.4 Filter Backwash Water* *Not applicable for municipalities that only distribute water purchased from another Municipal Public Drinking Water Supply				
i. Document the impact on the raw water source if water from the filter backwash treatment system is discharged upstream of the raw water intake.	☐	☐		
ii. Provide recommendations if this discharge impacts the source.	☐	☐		
2.5 Source Quantity* *Not applicable for municipalities that only distribute water purchased from another Municipal Public Drinking Water Supply				
i. Compile existing Water Withdrawal Approvals and include copies of these as an Appendix.	☐	☐		
ii. Complete Table A.6.a and A.6.b to compare water withdrawals to approved limits.	☐	☐		
iii. Recommend corrective actions, including water conservation measures, if water withdrawals are greater than approved limits.	☐	☐		
iv. Recommend corrective actions if water withdrawals are approaching approved limits and growth is forecast to increase withdrawals beyond approved limits.	☐	☐		

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.	Yes	N/A	Section	Page #
2.6 Source Water Protection Plan* *Not applicable for municipalities that only distribute water purchased from another Municipal Public Drinking Water Supply.				
i. Identify the source water protection zone(s) on a map.	☐	☐		
ii. Submit the source water protection zone(s) in GIS format to the Department. If zones are not available in GIS format, contact the Watershed Planner for your supply.	☐	☐		
iii. Summarize the status of the source water protection plan and implementation schedule.	☐	☐		
iv. Document the dates of the last two SWPP meetings.	☐	☐		
v. Note the status of meeting actions and/or SWPP deliverables.	☐	☐		
vi. Make recommendations to address any concerns identified by the advisory committee or the source water protection planning process.	☐	☐		
2.7 Conclusions and Recommendations				
i. Refer to the Terms of Reference.	☐	☐		

PART III
Treatment Processes, Facilities and Equipment

3.0 Evaluation of Treatment Processes, Facilities and Equipment

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.	Yes	N/A	Section	Page #
3.1 Treatment Processes				
i. Compile existing Approval(s) to Operate and include copies of these as an Appendix. For Approval Holders that only distribute water purchased from another Municipal Public Drinking Water Supply, document the name of the treatment facility, and proceed to section 3.2.	☐	☐		
3.1.1 Treatment Process Schematic				
i. Provide a schematic of the treatment process from the source to treated water entering the distribution system.	☐	☐		
3.1.2 Turbidity Levels and Associated Criteria				
a) Surface Water				
i. Verify that filtration technologies are meeting specified turbidity limits to receive the assigned log removal credits outlined in Table C2 of the Nova Scotia Treatment Standards for Municipal Drinking Water Systems by either Option 1 or Option 2.	☐	☐		
ii. Submit individual filter effluent turbidity values for the most recent calendar year by month (Option 1) or by the time interval graphed (Option 2).	☐	☐		
iii. Recommend corrective actions if the supply does not meet stipulated turbidity limits.	☐	☐		

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.	Yes	N/A	Section	Page #
iv. For Municipal Public Drinking Water Supplies with cartridge filters assigned log reduction credits for protozoa, provide the highest recorded individual filter differential pressure reading for each month of the most recent calendar year.	☐	☐		
v. Review the standard operating procedures (SOPs) for the filtration process: • Have control limits been set to alarm and notify operators of issues related to the filtration process? • Have procedures been developed to remove a filter or membrane unit from service before turbidity or differential pressure (i.e., for cartridge filters assigned log reduction credits) exceeds stipulated values? • Have procedures been implemented and communicated to all operations staff? • Have procedures been documented in the operations manual?	☐	☐		
vi. Inspect the filtration process to verify that continuous on-line turbidity measurements are taken and recorded for each individual filter at a minimum of once every five minutes.	☐	☐		

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.	Yes	N/A	Section	Page #
vii. Inspect the on-line turbidimeters: • Do they have the required range and accuracy to measure turbidity levels? • Are they in good working order? • Do they have a maintenance and quality assurance/calibration program?	☐	☐		
viii. Inspect the filtration process to verify that there are a minimum of two filters.	☐	☐		
ix. Document if the maximum day flow can be met with the largest filter out of service. Note: If the facility is unable to meet maximum day flows with the largest filter out of service, improvements to meet the Treatment Standards may be deferred to a future expansion provided SOPs are in place to minimize filter rate changes and spikes in turbidity which can result in filter breakthrough.	☐	☐		
x. Make recommendations to address any concerns identified by the review of the filtration SOPs, inspection of on-line turbidimeters, and filter redundancy.	☐	☐		

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.	Yes	N/A	Section	Page #
b) GUDI Wells				
i. Verify that natural filtration is achieving specified turbidity limits to receive the assigned log removal credits outlined in Table C2 of the Nova Scotia Treatment Standards for Municipal Drinking Water Systems by either Option 1 or Option 2.	☐	☐		
ii. Submit individual GUDI well turbidity values for the most recent calendar year by month (Option 1) or by the time interval graphed (Option 2).	☐	☐		
iii. For GUDI wells that do not meet stipulated turbidity limits, contact the Department to determine what requirements shall apply.	☐	☐		
iv. Inspect the site(s) to verify that continuous on-line turbidity measurements are taken for each individual GUDI wellhead at a minimum of once every five minutes.	☐	☐		
v. Inspect the on-line turbidimeters: • Do they have the required range and accuracy to measure turbidity levels? • Are they in good working order? • Do they have a maintenance and quality assurance/calibration program?	☐	☐		
vi. Make recommendations to address any concerns identified by the inspection of the on-line turbidimeters.	☐	☐		

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.	Yes	N/A	Section	Page #
c) Non-GUDI Wells				
i. Summarize turbidity levels in non-GUDI wells by either Option 1 or Option 2.	☐	☐		
ii. Note if measurements are by daily grab samples or continuous on-line turbidimeters.	☐	☐		
iii. Submit non-GUDI system turbidity for individual wells or combined flow for the most recent calendar year by month (Option 1) or by the time interval graphed (Option 2).	☐	☐		
iv. For non-GUDI wells that do not meet stipulated turbidity limits, contact the Department to determine what requirements shall apply.	☐	☐		
v. Where continuous measurements are taken, inspect the on-line turbidimeters: • Do they have the required range and accuracy to measure turbidity levels? • Are they in good working order? • Do they have a maintenance and quality assurance/calibration program?	☐	☐		
vi. Where grab samples are taken, inspect the monitoring equipment, SOPs, maintenance, and quality assurance/calibration program to ensure equipment is in good working order and measurements are appropriate.	☐	☐		
vii. Make recommendations to address any concerns identified by the inspection of on-line turbidimeters or grab sample protocols.	☐	☐		

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.	Yes	N/A	Section	Page #
3.1.3 Membrane Filtration – Additional Requirements				
i. Complete Table B.1 to verify that each individual membrane treatment unit that is used for pathogen reduction credits is free of any integrity breaches and determine its log removal value using pressure-based testing.	☐	☐		
ii. Make recommendations to address any concerns identified.	☐	☐		
iii. For Municipal Public Drinking Water Supplies with integrated membrane systems, summarize the process used to verify the rejection rate remains adequate for organics removal.	☐	☐		
iv. Make recommendations to address any concerns identified.	☐	☐		
3.1.4 Primary Disinfection				
i. Document how many inactivation log credits are required by the disinfection process for each target microorganism (e.g., protozoa and/or viruses).	☐	☐		
ii. Discuss how disinfection is achieved (e.g., chemical disinfectants, UV or both).	☐	☐		

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.	Yes	N/A	Section	Page #
a) Chemical Disinfection (CT Concept)				
i. Where chemical disinfectants are used, provide a schematic of the primary disinfection process including, but not limited to: • Tank(s) dimensions. • Baffling configuration and assumed baffling factor. • Water level operating range, highlighting the low level. • Disinfection type (e.g., free chlorine, chlorine dioxide, ozone). • Minimum disinfectant concentration at the CT control point. • Minimum water temperature. • Maximum pH of the water for free chlorine or optimum pH for chlorine dioxide or ozone. • Maximum flow and minimum retention time - if the tank used to achieve CT is subject to water level fluctuations, verify if the inflow/outflow represents the maximum flow condition.	☐	☐		
ii. Calculate the design CT.	☐	☐		
iii. Verify that operational conditions remained within the design range for achieving CT at all times during the most recent calendar year.	☐	☐		
iv. Where operational conditions went outside the design range, identify the cause, document the corrective actions taken and verify that CT was calculated during every such event.	☐	☐		
v. Make recommendations to address any concerns identified.	☐	☐		
b) UV Disinfection (IT Concept)				

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.	Yes	N/A	Section	Page #
i. Where UV disinfection is used, provide a schematic of the primary disinfection process including, but not limited to: • Unit manufacturer and model. • Validation standard. • Maximum flow. • Minimum intensity at the end of lamp life. • Minimum transmittance at the end of lamp life. • Correction for water temperature. • Maximum concentrations for water quality parameters that promote fouling (e.g., iron, manganese, hardness). • Sleeve cleaning method.	☐	☐		
ii. Verify that the unit has been designed to deliver a UV dose of 40 mJ/cm^2 or Department accepted alternate dose. Specify the alternate dose, if applicable.	☐	☐		

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.	Yes	N/A	Section	Page #
iii. Verify that the following conditions were met at all times during the most recent calendar year: • Was the intensity above the minimum required? • Was the flow below the maximum allowed? • Was the transmittance above the minimum required?	☐	☐		
iv. Where operational conditions went outside the design range, identify the cause, document the corrective actions taken and verify that IT was calculated during every such event.	☐	☐		
v. Provide recommendations to address any concerns identified.	☐	☐		
c) Redundancy, Continuous Monitoring and Alerting				
i. Inspect the primary disinfection process to verify the following: • Are there a minimum of two primary disinfection units? • Are the primary disinfection units sized to meet maximum day demand with one unit out of service? • Is on-line monitoring of the primary disinfection process in place with measurements taken and recorded at least once every five minutes? • Have control limits been set to alarm and notify operators that the primary disinfection process is not working properly? • Are protocols in place to prevent inadequately disinfected water from entering the distribution system?	☐	☐		
ii. Inspect the on-line instrumentation: • Do they have the required range and accuracy to measure chlorine concentrations?	☐	☐		

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• Are they in good working order? • Do they have a maintenance and quality assurance/calibration program?				
iii. Provide recommendations to address any concerns identified.	☐	☐		
d) Standard Operating Procedures				
i. Review the standard operating procedures for the disinfection process: • Do they specify the design ranges for achieving CT (e.g., temperature, disinfectant residual, flow, pH) or IT (e.g., intensity, flow, transmittance)? • Do they include notification and response procedures when operational conditions are outside CT or IT design ranges? • Do they include procedures to ensure the disinfection process is working properly? • Do they include response procedures when the disinfection process is not working properly? • Have they been implemented and communicated to all operations staff? • Have they been documented in the operations manual?	☐	☐		
ii. Provide recommendations to address any concerns identified.	☐	☐		
3.1.5 Secondary Disinfection				
i. Describe the secondary disinfection process.	☐	☐		
ii. Inspect the secondary disinfection process to verify the following:	☐	☐		

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.	Yes	N/A	Section	Page #
• Are on-line continuous chlorine residual monitors in place to measure chlorine residual entering the distribution system at least once every five minutes? • Are the on-line chlorine residual monitors in good working order? • Is there a maintenance and quality assurance/calibration program in place?				
iii. Where free chlorine is used for both primary and secondary disinfection, refer to Section 3.1.4 and note if the chlorine dose is controlled by CT (primary disinfection) or distribution system residual maintenance (secondary disinfection).	☐	☐		
iv. Where UV light is used for primary disinfection to receive protozoa inactivation credits, calculate the design CT for virus inactivation credits.	☐	☐		
v. Where UV light is used for primary disinfection to receive protozoa inactivation credits, verify that operational conditions remained within the design range for achieving CT for virus inactivation at all times during the most recent calendar year.	☐	☐		

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.	Yes	N/A	Section	Page #
vi. Where operational conditions went outside the design range, identify the cause, document the corrective actions taken and verify that CT was calculated during every such event.	☐	☐		
vii. Provide recommendations to address any concerns identified.	☐	☐		
3.1.6 Other Critical Processes				
i. Evaluate and inspect other critical processes against established standards and guidelines.	☐	☐		
ii. Recommend corrective actions where necessary.	☐	☐		
3.1.7 Waste Streams				
a) Filter-to-Waste				
i. Describe the filter-to-waste process.	☐	☐		
ii. For chemically assisted filtration, verify that turbidity is less than or equal to 0.2 NTU before returning a filter to service.	☐	☐		
iii. Identify recommendations, if necessary, to meet the Nova Scotia Treatment Standards for Municipal Drinking Water Systems.	☐	☐		
b) Filter Backwash Water – Discharge Into A Freshwater Watercourse				
i. Summarize treatment of the filter backwash water, if applicable, and identify the watercourse it is discharging into.	☐	☐		
ii. Identify any discharge criteria specified in the Approval to Operate.	☐	☐		

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.	Yes	N/A	Section	Page #
iii. Complete Table B.2. • Does sampling meet the minimum requirements as outlined in the Nova Scotia Treatment Standards for Municipal Drinking Water Systems? • Does effluent quality meet the discharge criteria stipulated in the Approval to Operate?	☐	☐		
iv. If the water quality does not meet the discharge criteria stipulated in the Approval to Operate or if there are no discharge criteria stipulated in the Approval to Operate, identify recommendations to meet the requirements specified in Part V – Management of Waste Streams of the Nova Scotia Treatment Standards for Municipal Drinking Water Systems.	☐	☐		
v. Recommend corrective actions where necessary to address any concerns identified.	☐	☐		

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.	Yes	N/A	Section	Page #
c) Filter Backwash Water – Discharge To Land Or Soil				
i. Summarize treatment of the filter backwash water, if applicable, and identify the location of discharge.	☐	☐		
ii. Identify whether the municipal public drinking water supply has a Discharge Management Plan in accordance with Part V – Management of Waste Streams of the Nova Scotia Treatment Standards for Municipal Drinking Water Systems, as amended from time to time.	☐	☐		
iii. Identify the effluent discharge criteria specified in the Approval to Operate, or the Department accepted Discharge Management Plan.	☐	☐		
iv. Complete Table B.3. • Does effluent quality meet the discharge criteria stipulated in the Approval to Operate, or the Department accepted Discharge Management Plan?	☐	☐		
v. If the water quality does not meet the discharge criteria stipulated in the Approval to Operate, or the Department accepted Discharge Management Plan, identify recommendations to meet the minimum requirements for a plan specified in Part V – Management of Waste Streams of the Nova Scotia Treatment Standards for Municipal Drinking Water Systems, as amended from time to time.	☐	☐		
vi. Identify operational, maintenance, and monitoring procedures in the Discharge Management Plan that do not meet the minimum requirements for a plan as specified in Part V – Management of Waste Streams of the Nova Scotia Treatment Standards for Municipal Drinking Water Systems, as amended from time to time.	☐	☐		
vii. Recommend corrective actions where necessary to address any concerns identified.	☐	☐		

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.	Yes	N/A	Section	Page #
d) Filter Backwash Water – Discharge To A Marine Or Brackish Environment				
i. Summarize treatment of the filter backwash water, if applicable, and identify the watercourse it is discharging into.	☐	☐		
ii. Identify any discharge criteria specified in the Approval to Operate.	☐	☐		
iii. Complete Table B.4. • Does effluent quality meet the discharge criteria stipulated in the Approval to Operate?	☐	☐		
iv. Recommend corrective actions where necessary to address any concerns identified.	☐	☐		
e) Other Waste Streams				
i. Review other waste streams and verify that they are being managed appropriately.	☐	☐		
ii. Provide recommendations to address any concerns identified.	☐	☐		

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.	Yes	N/A	Section	Page #
3.2 Distribution Water Quality				
3.2.1 Chlorine Residual Levels				
i. Review distribution system chlorine residuals for the most recent calendar year available.	☐	☐		
ii. Recommend corrective actions where residuals are routinely less than 0.20 mg/L or 0.40 mg/L (depending on the concentration specified in the Municipal Public Drinking Water Supply's Approval to Operate) where free chlorine is used (or less than 1.0 mg/L combined chlorine for chloraminated systems).	☐	☐		
iii. Inspect all distribution water storage tanks to verify that on-line continuous chlorine residual monitors are in place to measure chlorine residual at the storage tank outlet at least once every five minutes.	☐	☐		
iv. Inspect the on-line chlorine residual monitors to ensure that they are in good working order and that a maintenance and quality assurance/calibration program is in place.	☐	☐		
v. Recommend corrective actions where necessary.	☐	☐		

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.	Yes	N/A	Section	Page #
3.2.2 Microbiological Water Quality				
i. Review total coliforms and E. coli results for the most recent calendar year available.	☐	☐		
ii. Discuss any presence of bacteria in the distribution system and identify recommendations where necessary.	☐	☐		
iii. Verify that sampling locations and frequencies meet the requirements of the Guidelines for Monitoring Public Drinking Water Supplies Part I, including any re-sampling required after the presence of bacteria is detected.	☐	☐		
iv. Identify sampling locations on a map of the distribution system.	☐	☐		
v. Recommend sampling location/frequency changes if necessary.	☐	☐		

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.	Yes	N/A	Section	Page #
3.2.3 Turbidity				
i. Review distribution system turbidity results for the most recent calendar year available.	☐	☐		
ii. Verify that a protocol exists for investigating the cause of turbidity values above 5 NTU.	☐	☐		
iii. Discuss any values above 5 NTU and identify recommendations identified where necessary.	☐	☐		

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.	Yes	N/A	Section	Page #
3.2.4 Cross Connection Control Program				
i. Review the cross connection control program. • Does it meet the minimum requirements as outlined in A Guide to Assist Nova Scotia Municipal Water Works Develop a Cross Connection Control Program, as amended from time to time. • Are implementation timelines being met in accordance with the accepted plan? Provide an update on the status of the Cross Connection Control Program, including any modifications to the plan or implementation schedule, and a summary of the activities taken to achieve the goals and objectives of the program.	☐	☐		
ii. Provide recommend where necessary.	☐	☐		
3.2.5 Other Distribution System Monitoring/Programs				
i. Review any other distribution system monitoring or programs that are in place to deal with threats to distribution system integrity, including but not limited to infrastructure age, watermain breaks, leak detection, pressure transients, etc.	☐	☐		
ii. Provide recommendations where necessary.	☐	☐		

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.	Yes	N/A	Section	Page #
3.3 Site Inspection				
i. Conduct a site inspection to evaluate treatment processes, as well as other facilities and equipment as per the requirements outlined in section 3.3 of the Terms of Reference.	☐	☐		
3.4 Conclusions and Recommendations				
i. Refer to section 3.4 of the Terms of Reference.	☐	☐		

PART IV
Operations, Monitoring and Management

4.0 Review of Operations, Maintenance, Monitoring and Management

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.	Yes	N/A	Section	Page #
4.1 Operations and Maintenance				
i. Review the comprehensive operations manual: • Does one exist? • Is it current and up to date? • Does it include SOPs, emergency notification procedures and contingency plans? • Is it available on site or an alternate location accepted by the Department? • Are operations staff aware of its contents?	☐	☐		
ii. Evaluate the procedures an operator follows to identify any problem(s) with the water treatment and distribution process, determine the changes needed to correct the problem(s) and how adjustments to the processes are approved and performed as needed.	☐	☐		
iii. Verify that a maintenance program exists and is adequate to ensure the long-term viability of the Municipal Public Drinking Water Supply, including distribution system components.	☐	☐		
iv. Identify recommendations where necessary.	☐	☐		
4.2 Monitoring and Reporting				

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.	Yes	N/A	Section	Page #
i. Review the annual monitoring program to: • Does one exist? • Is it current and up to date? • Does it meet the minimum requirements as outlined in the Nova Scotia Treatment Standards for Municipal Drinking Water Systems and A Guide to Assist Nova Scotia Municipal Water Works Prepare Annual Sampling Plans? • Are operations staff aware of its contents?	☐	☐		
ii. Identify the laboratories being used for water quality analyses.	☐	☐		
iii. Verify that the Municipal Public Drinking Water Supply is operating in accordance with the Policy on Acceptable Certification of Laboratories.	☐	☐		
iv. Review reporting requirements and verify that the Approval Holder has complied with the immediate, annual and ad hoc reporting requirements outlined in the Nova Scotia Treatment Standards for Municipal Drinking Water Systems.	☐	☐		
v. Review the most recent annual report and identify any concerns in the System Assessment Report.	☐	☐		
vi. Identify recommendations where necessary.	☐	☐		

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.	Yes	N/A	Section	Page #
4.3 Management				
i. Review the number of certified operators and back-up personnel to verify that the municipal public drinking water supply is operating in accordance with Part I of the Water and Wastewater Facilities and Public Drinking Water Supplies Regulations.	☐	☐		
ii. Complete Table C.1 to identify the operator(s) in overall direct responsible charge (ODRC) and summarize what protocols are in place during the absence of the operator(s) in ODRC. Note: The ODRC operator(s) must sign Table C.1.	☐	☐		
iii. Review the water quality goals that the Municipal Public Drinking Water Supply has and evaluate their plan(s) to accomplish or maintain these goals.	☐	☐		
iv. Identify recommendations where necessary.	☐	☐		
4.4 Conclusions and Recommendations				
i. Refer to section 4.4. of the Terms of Reference.	☐	☐		

PART V
REPORT SUBMISSION

5.0 Ability to Comply

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.	Yes	N/A	Section	Page #
5.1 Summary				
i. Summarize conclusions and identify all recommendations necessary to meet the Nova Scotia Treatment Standards for Municipal Drinking Water Systems.	☐	☐		
ii. Include preliminary cost estimates and an implementation schedule to address the above requirements. Costs shall be presented and prioritized with respect to public health risks. Note: If the corrective action plan submitted to the Department varies from the risk-based approach documented in the System Assessment Report, written justification shall be included in the corrective action plan for varying the priority.	☐	☐		
iii. Highlight any obvious problems associated with the Municipal Public Drinking Water Supply that jeopardize treated water quality to the point that it no longer meets the health protection standards adopted by the Department.	☐	☐		

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.	Yes	N/A	Section	Page #
5.2 Report Preparation				
i. Submit three (3) copies of the System Assessment Report to the Department and include a copy of this completed checklist.	☐	☐		
ii. Engineer's Declaration (refer to section 1.4 of the Terms of Reference)	☐	☐		