



Municipality of Strathroy-Caradoc Water Distribution System

DRINKING WATER QUALITY MANAGEMENT SYSTEM OPERATIONAL PLAN

March 3, 2025

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INTRODUCTION

Purpose

The purpose of this operational plan is to describe the comprehensive Drinking Water Quality Management Standard developed and implemented by the Municipality of Strathroy-Caradoc for the operation and maintenance of the water distribution system.

This DWQMS Operational Plan includes references to all components of the DWQMS.

Scope


This Operational Plan covers the activities and personnel associated with all operational aspects of the drinking water distribution system for the Municipality of Strathroy-Caradoc. This Operational Plan, the procedures, work instructions and other DWQMS documentation that are referenced herein are complementary to the legislated requirements for safe drinking water in the Province of Ontario.

Definitions and Acronyms

QMS	Quality Management System.
DWQMS	Drinking Water Quality Management Standard.
MECP	Ministry of Environment Conservation and Park
OIC	Operator in Charge.
ORO	Overall Responsible Operator.
SCADA	Supervisory Control and Data Acquisition.
CCP	Critical Control Point. A step or point in the drinking water system at which control can be applied by the Operating Authority and is essential to prevent or eliminate a drinking water health hazard or reduce it to an acceptable level.
Distribution	Watermains and related items (i.e. hydrants, valves).
Waterworks	Strathroy-Caradoc Drinking Water Distribution System.
Planned Purchase	The purchase of a product or service that is not required immediately by the Water Distribution System in order to support the continual supply of safe drinking water.
Unplanned Purchase	The purchase of a product or service that is required immediately by the Water Distribution System in order to support the continual supply of safe drinking water.
Auditee	Individual or group of individuals conducting or owning the activities and/or requirement being audited.

References

Drinking Water Quality Management Standard – Version 2, February 2017
Applicable Ontario Safe Drinking Water Legislation

DRINKING WATER QUALITY MANAGEMENT SYSTEM QMS Element 1: Quality Management System	
Revision No. 3	

1.0 QUALITY MANAGEMENT SYSTEM

1.1 Purpose

The Municipality of Strathroy-Caradoc, as the Owner and Operating Authority of its drinking water system, is required to attain conformance to the Drinking Water Quality Management Standard developed by the Ministry of Environment, Conservation and Parks (MECP) through the Municipal Drinking Water Licensing Program. This Operational Plan has been developed to represent the Operating Authority's Quality Management System (QMS) that conforms to the Standard.

1.2 Scope

The Municipality of Strathroy-Caradoc water distribution system receives treated water from the Lake Huron Primary Water Supply. This Operational Plan covers the water distribution system that is owned by the Municipality of Strathroy-Caradoc (Owner) and operated by the Engineering and Public Works Department - Environmental Services Division (Operating Authority). The Drinking Water Quality Management System (DWQMS) for the Municipality of Strathroy-Caradoc covers the transmission and distribution of potable drinking water to consumers serviced by the Strathroy-Caradoc Water Distribution System.

1.3 Schedule C – Director's Directions for Operational Plans

Ontario 	Ministry of the Environment, Conservation and Parks	Schedule C – Director's Directions for Operational Plans (Subject System Description Form) Municipal Residential Drinking Water System
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Fields marked with an asterisk (*) are mandatory.

Owner of Municipal Residential Drinking Water System *
Municipality of Strathroy-Caradoc

Subject Systems

Name of Drinking Water System (DWS) *	Licence Number *	Name of Operating Subsystems (if applicable)	Name of Operating Authority *	DWS Number(s) *
1. Strathroy-Caradoc Distribution System	058-201v4		Municipality of Strathroy-Caradoc	260080106

Contact Information for Questions Regarding the Operational Plan

Primary Contact

Last Name *	First Name *	Middle Initial
Zuberbuhler	Paul	
Title *	Telephone Number *	Email Address *
Manager of Environmental Services	519-245-1105 ext.274	pzuberbuhler@strathroy-caradoc.ca

Secondary Contact

Last Name	First Name	Middle Initial
Ortiz	Mark	
Title	Telephone Number	Email Address
Director Engineering and Public Works	519-245-1105 ext.247	mortiz@strathroy-caradoc.ca

REFERENCES

Drinking Water Quality Management Standard –Version 2.0 February 2017

Table of Revisions

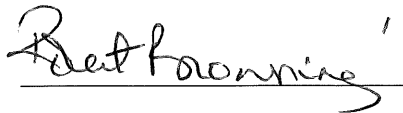
Revision No.	Date (dd/mm/yyyy)	Description of Revision
1	18/02/2020	Updated procedure to include revision table
2	23/09/2022	Updated procedure to include Schedule C – Directors Directions
3	20/02/2025	Updated Schedule C – Directors Directions

2.0 QUALITY MANAGEMENT SYSTEM POLICY**QMS POLICY**

The Municipality of Strathroy-Caradoc as the owner of the treatment and distribution drinking water system is committed to:

- ✓ Supplying a safe, consistent, drinking water supply to our residents and businesses;
- ✓ Complying with applicable legislative and regulatory requirements;
- ✓ Implementing, maintaining and contribution to the continual improvement of the Quality Management System;
- ✓ Providing an Operational Plan that is available and accessible for ready communication to the Owner, Top Management, Operating Authority Personnel and the public.

The Municipality of Strathroy-Caradoc will strive to achieve these goals through the implementation of a management system and staff competency to our customers.



Robert Browning

Chief Administrative Officer



Paul Zuberbuhler

Manager of Environmental Services

Table of Revisions

Revision No.	Date (dd/mm/yyyy)	Description of Revision
3	28/04/2023	Signatures updated
4	29/08/2023	Signatures updated
5	26/02/2025	CAO Name change & Signature updated

3.0 COMMITMENT AND ENDORSEMENT

3.1 Purpose

The purpose of this document is for the planning, operation and maintenance of the Corporation of the Municipality of Strathroy-Caradoc Water Distribution System.

3.2 Scope

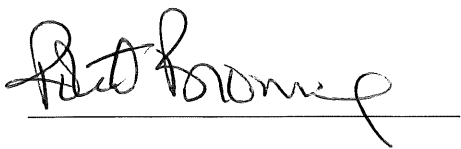
The Owner endorses the Operational Plan through a Council resolution. The Owner's commitment to an effective Quality Management System (QMS) is evidenced by the resources provided during implementation of the Operational Plan and QMS.

The Corporation of the Municipality of Strathroy-Caradoc (Owner) and Top Management of the Operating Authority are committed to the implementation, maintenance and continual improvement of a Quality Management System that meets the requirements of the Drinking Water Quality Management Standard (DWQMS).

Top Management's commitment to an effective QMS is evidenced by:

- a) Ensuring that a QMS is in place that meets the requirements of the DWQMS,
- b) Ensuring that Operating Authority staff are aware of all applicable legislative and regulatory requirements,
- c) Communicating the QMS according to procedures and,
- d) Determining, obtaining or providing the resources needed to maintain and continually improve the QMS.

Endorsed by:



Robert Browning

Chief Administrative Officer

Table of Revisions

Revision No.	Date (dd/mm/yyyy)	Description of Revision
3	28/04/2023	Signature updated
4	29/08/2023	Signature updated
5	03/03/2025	CAO change and updated signature

4.0 QUALITY MANAGEMENT SYSTEM REPRESENTATIVE

NOTICE OF APPOINTMENT

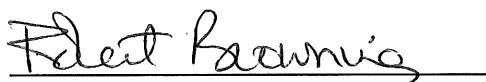
QMS Representative

Top Management for the Operating Authority (Engineering and Public Works Department) at the Municipality of Strathroy-Caradoc has appointed the Quality Management System Representative to be:

Paul Zuberbuhler, Manager of Environmental Services

The Quality Management System (QMS) Representative will be responsible for the following:

- Ensuring that processes and procedures needed for the QMS are established and maintained,
- Reporting to Top Management on the performance of the QMS and any need for improvement, as needed, or during the Management Review meetings,
- Ensure that current versions of documents required by the QMS are being used at all times, and
- Ensure that personnel are aware of all current regulatory and legislative requirements that are relevant to the operation of the Municipality of Strathroy-Caradoc's drinking water system.



Robert Browning

Chief Administrative Officer

Table of Revisions

Revision No.	Date (dd/mm/yyyy)	Description of Revision
3	28/04/2023	Signature updated
4	29/08/2023	Signature updated
5	26/02/2025	Name change and signature updated

DRINKING WATER QUALITY MANAGEMENT SYSTEM	
QMS Element 5: Document and Records Control	
Revision No. 3	

5.0 DOCUMENT AND RECORDS CONTROL

5.1 Documents Control

5.1.1 Purpose

The purpose of this procedure is to define the method for Document Control which includes the following:

- Document development
- Document review and approval
- Document issuance
- Changes to Documents
- Retention of obsolete documents

5.1.2 Scope

The Control of Documents procedure is applicable to all Strathroy-Caradoc employees who manage or perform work related to the water distribution system operations.

5.1.3 Procedure

General Procedure

- The DWQMS Operational Plan is a controlled document that consists of the policies, procedures, forms, flowcharts and other documents that are subject to revision and are maintained on the Document and Records Master List (Form ES 01).
- Controlled documents of both internal (refers to documents created by the Operating Authority) or external origin are listed on the Document and Records Master List. The QMS Representative is responsible for maintaining the electronic list updated.
- All electronically controlled documents for the QMS are available on the Engineering Public Works drive and are kept current by updating annually. The network drive is maintained by the Municipality of Strathroy-Caradoc IT Department and backed up every 24 hours.
- All forms required by the QMS contain a header (form number and revision date).
- Reviews and edits are summarized in the Table of Revisions located at the end of each element
- To keep the revision table from becoming overwhelmingly large, only the current revision summary and the 2 (two) previous revision summaries will be listed in the revision table.
- A notation will be made in the revision table of the associated procedure indicating the procedure was reviewed and outline major edits made.

DRINKING WATER QUALITY MANAGEMENT SYSTEM	
QMS Element 5: Document and Records Control	
Revision No. 3	

- All equipment manuals are kept in binders, in the appropriate facility. Each binder contains a list of contents – by equipment type and/or by manufacturer.
- The QMS Representative determines the location where controlled documents are available. These locations along with the title number and the revision date are recorded on the Document and Records Master List.
- All staff is responsible for ensuring that documents remain legible and readily identifiable. If a document has been damaged or made illegible, staff are to immediately request a replacement copy from the QMS Representative.
- Documents that are only available in hard copy are kept in a safe dry location that will ensure no damage or deterioration.
- QMS documentation is reviewed for evidence of control in accordance with the Internal Audit schedule.

Document Creation/Changes

An Operating Authority Employee may request the creation of a new document, deletion of an existing document, or changes to an existing one. The employee shall obtain a Document Change/Creation Request Form (Form ES 02) from the EPW Drive. The employee shall complete the form and return it along with a sample copy of the new or changed document. The QMS Representative shall take the following action upon receipt of the completed form:

Review the completed Document Change/Creation Request Form, and if accepted, send the appropriate documentation to the Environmental Services Coordinator or designate to carry out the following tasks:

- a) Create the new document using the appropriate template, or
- b) Change the current controlled document to incorporate the change(s) requested.

If not accepted the Document Change/Creation Request Form and related material(s) shall be returned to the originator with an explanation.

Document Change/Creation Requests are electronically filed. The staff will receive a notification of the change.

The Environmental Services Coordinator shall update the Document and Records Master List. Grammatical, spelling and small changes/corrections that do not alter the content of the document may be made at any time by the QMS Representative, or designated person(s). These changes are not subject to the use of a Document Change/Creation Request Form or the document review and approval process.

Obsolete Documents

When a document is superseded, the obsolete document shall be removed from its location, and forwarded to the QMS Representative for disposal by shredding.

DRINKING WATER QUALITY MANAGEMENT SYSTEM QMS Element 5: Document and Records Control	
Revision No. 3	

In cases where an obsolete document needs to be retained for knowledge or other purposes, the QMS Representative shall electronically file the retained copy in the appropriate location on the EPW Drive.

5.2 Records Control

5.2.1 Purpose

The purpose of this procedure is to describe the methods for identification, storage, protection, retrieval, retention time and disposition of records.

5.2.2 Scope

This procedure is applicable to all Municipality of Strathroy-Caradoc employees who manage or perform work related to the water distribution system and covers all Quality records identified in the implemented QMS.

5.2.3 Procedure

- Records are maintained as objective evidence that the requirements of the Ontario Ministry of Environment Regulations and the DWQMS are being effectively addressed. The Document and Records Master List (ES 01) identifies all of the records that this procedure applies to.
- Records may be retained in hard copy (i.e. test reports, equipment maintenance and calibration, etc.) or in electronic format (i.e. SCADA, lab results, excel, etc.). Once the electronic records associated with the QMS are closed, they will be protected and maintained on the Engineering and Public Works network drive which is backed up every 24 hours by the Municipality of Strathroy-Caradoc IT Department.

Records Required by MECP Regulations

- All records required by the MECP regulations to demonstrate compliance and/or conformance shall be maintained per the regulations.
- All records required to demonstrate conformance to the requirements of the DWQMS shall be retained for the minimum time period of 5 years.
- All logs, records and reports that demonstrate compliance and/or conformance shall be retained/filed chronologically by type and in such a manner as to make them accessible. Additionally, data/information entered into all logs, records and reports shall clearly identify the individual responsible for making the entry.
- All records and reports that demonstrate compliance and/or conformance shall be stored in a manner that protects them from damage or deterioration. Care shall be taken to ensure that no records, hard or soft copy, are exposed to elements or conditions that may damage the integrity of the information contained therein.

DRINKING WATER QUALITY MANAGEMENT SYSTEM	
QMS Element 5: Document and Records Control	
Revision No. 3	

- Records that have exceeded the minimum retention times prescribed by regulation or this procedure shall be disposed of by shredding, or removal from EPW drive by request to IT department, under the authorization of the Manager of Environmental Services. Any records that are retained for knowledge, legal or other purposes beyond the specified minimum retention time may be stored separate from those records that are deemed to be current.
- Where required by regulation, records shall be made available to the public through the Municipality of Strathroy-Caradoc website, or upon request.
- All records shall be readily retrievable for the purposes of the Owner or for inspection by the regulatory body.

REFERENCES

Form ES 01 Document and Records Master List

Form ES 02 Document Change/Creation Request

Table of Revisions

Revision No.	Date (dd/mm/yyyy)	Description of Revision
1	13/02/2020	Updated procedure to include revision table.
2	24/10/2022	Updated procedure to include ES Coordinator & removal of footers requirement on Documents
3	25/04/2023	Procedure updated to reflect Internal Document updates (forms/documents to begin with ES, followed by sequential numbering)

DRINKING WATER QUALITY MANAGEMENT SYSTEM	
QMS Element 6: Drinking Water System	
Revision No. 3	

6.0 DRINKING WATER SYSTEM

6.1 Purpose

To provide an overview of the Municipality of Strathroy-Caradoc Water Distribution System.

6.2 Procedure

System Overview

Potable drinking water is supplied to the Strathroy-Caradoc Water Distribution System from the Lake Huron Primary Water Supply. The water treatment plant is owned by the Lake Huron Primary Joint Board of Management and operated by Ontario Clean Water Agency.

Treated potable drinking water is purchased from the Lake Huron Primary Water System, which is owned by a joint board of management consisting of member municipalities. The potable water enters the Strathroy-Caradoc Distribution System through two metered connections to the Lake Huron Primary Water System.

Strathroy-Caradoc Water Distribution System

This Operational Plan covers the Strathroy-Caradoc Drinking Water Distribution system that is owned and operated by the Municipality of Strathroy-Caradoc. The Municipality also provides water distribution services to the Township of Adelaide-Metcalf Centre Road Service Area through agreement with the Township of Adelaide-Metcalf.


The water distribution system consists of water mains ranging in size from 50mm to 400mm diameter. Inventory of infrastructure assets (watermains, valves and fire hydrants) and water distribution maps are updated annually based on new construction/reconstruction projects.

There are 8 sampling sites for microbiological testing and chlorine residual monitoring in the distribution system. Sampling procedure is available in QMS 16.00 Sampling, Testing and Monitoring.

Sampling Site Location	Town
Albert Street Sample Station	Strathroy
61 Albert Street – Environmental Services Building	Strathroy
Carroll Street E at Parkview Drive Sample Station	Strathroy
Adair Boulevard Sample Station	Strathroy
Strathroy Works Yard	Strathroy
Mount Brydges Water Tower	Mount Brydges
Mount Brydges Works Yard	Mount Brydges
Birmingham Sample Station	Mount Brydges

Overview of Major Water Distribution Components

The water distribution system consists of two water towers and two reservoirs in order to meet the daily supply/demand requirements:

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QMS Element 6: Drinking Water System	
Revision No. 3	

Site	Capacity (m3)
Strathroy Reservoir	11,250
Strathroy Water Tower	1,900
Mount Brydges Reservoir	1,639
Mount Brydges Water Tower	720

The Strathroy-Caradoc Water Distribution Systems is supplied by two separate pump stations. The following table details the pumping capabilities for both stations:

Site	Capacity (L/s)
<u>Strathroy</u>	
Pump #1 Zone 1	80
Pump #2 Zone 1	139
Pump #3 Fire Pump	212
Pump #4 Zone 2	39
Pump #5 Zone 2	39
<u>Mount Brydges</u>	
Pump #1	41
Pump #2	60
Pump #3	58.13
Pump #4	58.13

Maps detailing the Strathroy-Caradoc's Water Distribution Systems are available at:
<https://middlesex.maps.arcgis.com/apps/webappviewer/index.html?id=23489e4130c34cccb36220617c8a9570>

REFERENCES

Strathroy and Mount Brydges Pump Station Schematic Drawings
QMS Element 16.1 Sampling Procedure

Table of Revisions

Revision No.	Date (dd/mm/yyyy)	Description of Revision
1	18/02/2020	Updated procedure to include revision table.
2	03/02/2022	Sample Site location and Water Distribution map digital location updated.
3	23/09/2022	Water Distribution map digital location updated

DRINKING WATER QUALITY MANAGEMENT SYSTEM QMS Element 7: Risk Assessment	
Revision No. 7	

7.0 RISK ASSESSMENT

7.1 Purpose

To document the procedure used to complete a risk assessment for the drinking water system. The procedure defines the method used for

- Identifying potential hazardous events and/or associated hazards
- Ranking hazardous events
- Identifying Critical Control Points (CCP)

7.2 Scope

This procedure is applicable to the Strathroy-Caradoc Environmental Services employees.

7.3 Procedure

- The Municipality of Strathroy-Caradoc shall identify potential hazardous events and associated hazards, rank them according to risk, determine Critical Control Points (CCP), and outline processes/procedures for monitoring, controlling and responding to deviations from these control limits.
- The QMS Representative shall assemble a Team to discuss and identify all potential hazards to the water distribution system. The Team may include the Director of Engineering and Public Works, the Manager of Environmental Services, Environmental Services Operator(s), Environmental Services Coordinator.
- As a first step, the Team identifies potential hazardous events that could affect the supply of safe drinking water. For each hazardous event, control measures were identified, along with associated operational/emergency procedures. The outcome of this task is included in the table Risk Assessment Outcomes (Form ES 03).
- For each hazardous event the Probability of Occurrence, Severity of the Hazard Occurring and Detectability were determined on a scale of 1 to 5. The values for each of these factors were added together to give a risk priority number.
- Once, every calendar year or following a major process change, the QMS Representative facilitates a review to verify the currency of the information and the validity of the assumptions used in the risk assessment process for the drinking water system. This may include changes to applicable regulations, changes to the water distribution and/or system/equipment, and/or infrastructure, or changes in water quality.
- A minimum of once every thirty-six months, the QMS Representative ensures that the risks stated in the Risk Assessment Outcome Table are assessed.
- Any Team member of the Drinking Water Distribution System can identify risks to water quality and/or sustained operations that have not already been analyzed. Hazards identified

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QMS Element 7: Risk Assessment	
Revision No. 7	

outside of the Risk Assessment review process are to be included on Continual Improvement Opportunities (Form ES 11).

RISK ASSESSMENT OUTCOME TABLE

Ranking Risk

Each hazard identified shall be “ranked” (as per table below) by the team according to:

- **Occurrence** is probability/likelihood of a hazard or hazardous event occurring.
- **Severity** is the potential impact to health or impact on operations if the risk is not controlled (assumes control measures do not work).
- **Detectability** is a measure of the ability to detect the presence of certain hazards. Hazards which could be easily and quickly detected were given a low value. Hazards that are hard to detect or undetectable are given a high value. The risk is greater as appropriate responses cannot be taken to control or mitigate the risk.

Rank	Ranking the Hazard Table		
	Occurrence	Severity	Detectability
1	Rare - exceptional circumstances or not at all	Insignificant - little to no product or operational impact	Obvious - Easy to detect, instantaneous (SCADA)
2	Unlikely - historically has occurred annually or less than annually	Minor - small population effect, manageable service disruption	Easy - Lab results or Distribution/consumer input
3	Possible - has occurred once or more per annum	Moderate - small population effect, modify operating parameters	Moderate - No alarm, Visually detectable
4	Likely - is expected to occur on a monthly to quarterly basis	Major - significant impact on small population, operations challenged	Difficult - Visually detectable, but not part of regular inspection routine
5	Certain - will occur on a frequent basis	Catastrophic - major impact on population, system failure	Impossible - Undetectable


All three values are added together to provide a **Risk Priority Number**

RPN Rating

- 0-5 None to minimal potential or actual impact
- 6-9 Moderate potential or actual impact
- 10-15 CCP: Significant potential or actual impact (Critical Control Point)

Critical Control Points

- All hazards or hazardous events which have an overall risk rating of 10 or higher shall be identified on the table. The process step associated with the high risk shall be designated as a Critical Control Point (CCP).
- All hazards or hazardous events which are recommended by the MECF and relevant to the drinking water system will also be included even if numerical threshold is not met.

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QMS Element 7: Risk Assessment	
Revision No. 7	

- Municipality of Strathroy-Caradoc staff identified associated emergency procedures and responses, and as appropriate included measures in Capital Plans to help eliminate or mitigate identified risks.
- Items that are not under control by the Operating Authority will be labelled as “not controllable event” in the Critical Control Point Requirement. Even though an event may be deemed a “not controllable event” there may be an associated procedure in the Contingency Plan.
- Issues arising from the Critical Control Points shall be reported to the Manager of Environmental Services. Any deviation from the Critical Control Limit shall require corrective action as found in the Contingency Plan.
- All corrective actions shall be documented as per the requirements of the Municipality of Strathroy-Caradoc Corrective Action Procedure (QMS Element 21.0 Continual Improvement Procedure).

REFERENCES

QMS Element 8.0 Risk Assessment Outcomes Procedure


QMS Element 21.0 Continual Improvement Procedure

Form ES 03 Risk Assessment Outcomes

Form ES 11 Continual Improvement Opportunities

Table of Revisions

Revision No.	Date (dd/mm/yyyy)	Description of Revision
5	23/09/2022	Updated procedure to include Environmental Services Coordinator
6	13/01/2023	Removal of Reference: QMS Form 08-02 Critical Control Point Procedure
7	25/04/2023	Procedure updated to reflect Internal Document updates (forms/documents to begin with ES, followed by sequential numbering)

DRINKING WATER QUALITY MANAGEMENT SYSTEM	
QMS Element 8: Risk Assessment Outcomes	
Revision No. 2	

8.0 RISK ASSESSMENT OUTCOMES

8.1 Purpose

This procedure describes the monitoring, response, recovery and recording tasks related to Critical Control Points identified on the Risk Assessment Outcomes.

8.2 Scope

The procedure is applicable to all personnel who operate and maintain the water distribution system.

8.3 Procedure


The risk assessment must be conducted as per QMS Element 7 Risk Assessment Procedure. The results of the risk assessment are to be recorded in the table Risk Assessment Outcomes (Form ES 03). The Contingency Plan contains the water operational procedures.

REFERENCES

Strathroy-Caradoc Water Supply, Storage and Distribution System – Contingency Plan
QMS Element 7.0 Risk Assessment
Form ES 03 Risk Assessment Outcomes

Table of Revisions

Revision No.	Date (dd/mm/yyyy)	Description of Revision
1	18/02/2020	Updated procedure to include revision table
2	25/04/2023	Procedure updated to reflect Internal Document updates (forms/documents to begin with ES, followed by sequential numbering)

DRINKING WATER QUALITY MANAGEMENT SYSTEM QMS Element 9: Organizational Structure, Roles, Responsibilities and Authorities	
Revision No. 5	

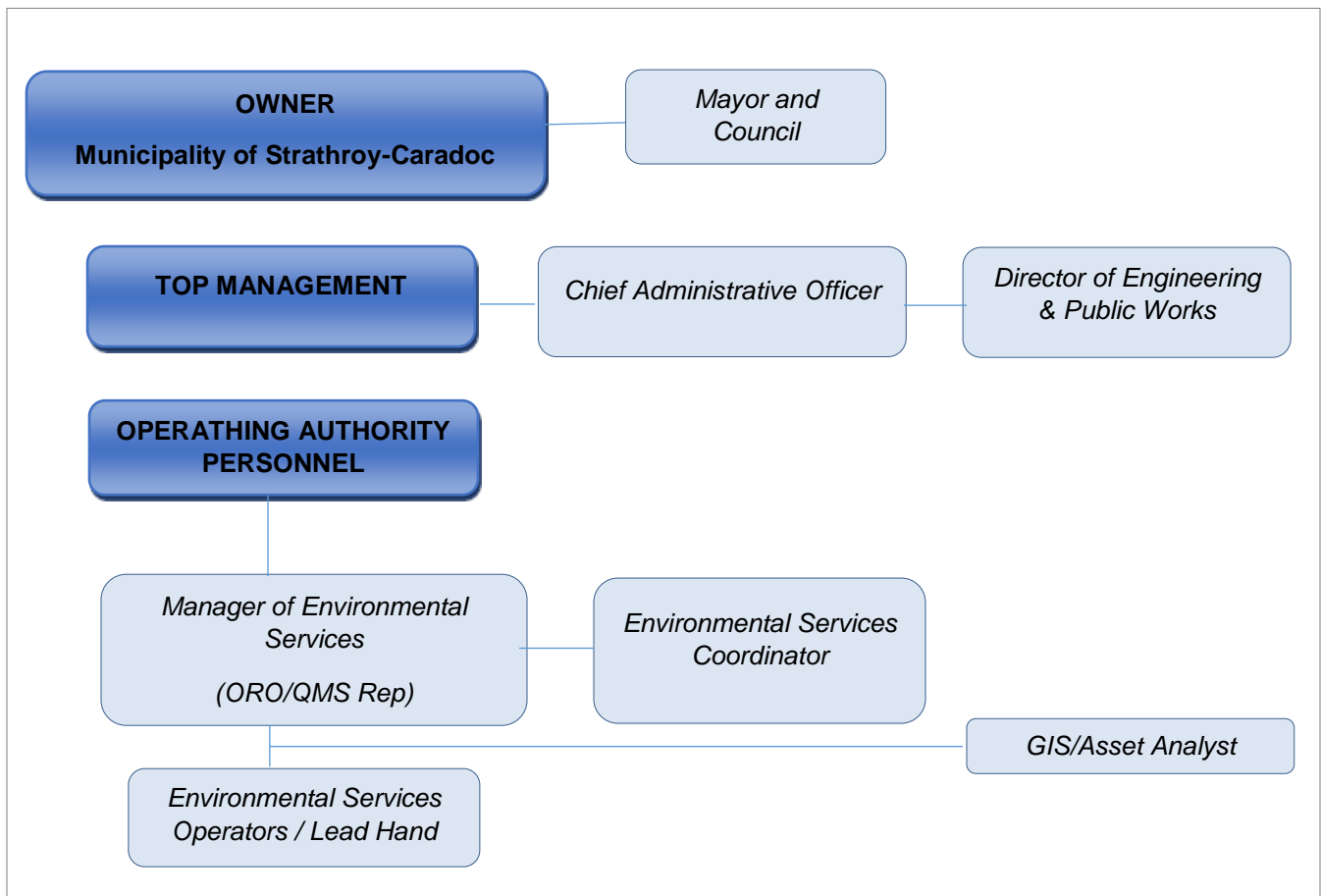
9.0 ORGANIZATIONAL STRUCTURE, ROLES, RESPONSIBILITIES AND AUTHORITIES


9.1 Purpose

To document a process that ensures the Owner and Top Management of the Operating Authority are defined, the organizational structure of the Operating Authority is described and the roles, responsibilities and authorities of Top Management and key positions within the Operating Authority are identified.

9.2 Procedure

Municipality of Strathroy-Caradoc Water Distribution Organizational Structure



DRINKING WATER QUALITY MANAGEMENT SYSTEM QMS Element 9: Organizational Structure, Roles, Responsibilities and Authorities	
Revision No. 5	


Roles, Responsibilities and Authorities

OWNER

Role	Responsibilities	Authorities
Council/Mayor	<ul style="list-style-type: none"> • Complete legal oversight of the Municipality of Strathroy-Caradoc water distribution system and the DWQMS. • Responsible for the delivery and supply of safe reliable drinking water to the citizens and visitors of the Municipality of Strathroy-Caradoc • Endorsing the DWQMS along with the Top Management 	<ul style="list-style-type: none"> • Delegate the management and operation of the drinking water system to qualified staff • Review, revise and approve proposed and existing bylaws, user fees, taxation rate, expenditures • Prescribe requirements and obligations for the operation of the waterworks

TOP MANAGEMENT


Role	Responsibilities	Authorities
Chief Administrative Officer (CAO)	<ul style="list-style-type: none"> • Responsible for reporting to the Mayor and Council on the management of the municipal water system • Ensuring that the policies and direction from Council are effectively communicated to management staff • Endorsing the ongoing development of the DWQMS and participating on the DWQMS Management Review 	<ul style="list-style-type: none"> • Ensure that management staff is in place to make sure the municipal water system is supplying safe and reliable drinking water • To convey and mandate council policy and direction to the department management staff
Director of Engineering and Public Works	<ul style="list-style-type: none"> • Responsible for reporting to Chief Administrative Officer and Owner on the performance of the municipal water distribution system and DWQMS • Communicating with the Owner, the public, regulatory authorities on behalf on the Operating Authority • Endorsing the QMS Operational Plan with the Owner • Appoint a QMS Representative 	<ul style="list-style-type: none"> • Perform all required duties • Evaluate and prioritize long-term department needs • When necessary, will appoint a temporary Overall Responsible Operator (ORO) position, in absence of the designated ORO • Recommend operational changes • Recommend requires resources to ensure the proper implementation and continuance of the DWQMS, including

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	<ul style="list-style-type: none"> • Address any possible policy, objective and other QMS element changes • Ensure compliance with the terms and conditions of the License and its components • Participate and represent the Municipal Owner on the DWQMS Management Review 	<ul style="list-style-type: none"> • access to personnel, access to equipment and financial resources • Provide standard notification to the Owner regarding Adverse Water Quality incidents or other non-compliance or non-conformances that have been identified.
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OPERATING AUTHORITY PERSONNEL

Role	Responsibilities	Authorities
Manager of Environmental Services -QMS Representative	<ul style="list-style-type: none"> • Complete oversight of the operations within the municipal water supply system to ensure drinking water is safe and the systems compliance with current regulations • Ensure management reviews are conducted every calendar year • Report to Top Management on the performance of the QMS and any need for improvement, as needed, or, during the management review meeting • Ensure that current versions of documents required by the QMS are being used at all times • Ensure personnel is aware of all current regulatory and legislative requirements that are relevant to the operation of the municipal drinking water system • Order supplies and process invoices 	<ul style="list-style-type: none"> • Act as the Overall Responsible Operator (ORO) and therefore must be available to be contacted 24/7. • Communicate with Regulatory Agencies • Develop, approve and implement operations, maintenance and safety policies and procedures related to water distribution • As a QMS Representative, this person is authorized to the overall managing role, responsible for overseeing the development and implementation of the DWQMS System
Lead Hand	<ul style="list-style-type: none"> • Responsible for performing operations and maintenance of the Water Distribution System in Strathroy-Caradoc • Record daily activities and report abnormal conditions to the Manager of Environmental Services • Supervise water operators to perform the assigned work, ensuring safety, quality and quantity of work • All duties of an Environmental Services Operator 	<ul style="list-style-type: none"> • Lead water operational staff in the daily operations and maintenance of the Water Distribution System • Respond to and document public complaints • Recommend changes to the QMS

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Environmental Services Operator	<ul style="list-style-type: none"> • Carry-out duties and tasks as assigned by the Lead Hand and as per established water distribution policies and procedures • Document all operating activities in facility/personal logs in accordance with Provincial legislation and established procedures • Report and act on incidents of non-compliance • Report any abnormal conditions to the Lead Hand • Order supplies 	<ul style="list-style-type: none"> • Monitor process equipment of day-to-day operations of the water distribution system and recommend corrective actions • Respond to and document public complaints • Recommend changes to the QMS • Act as Operator in Charge (OIC) • Act as Overall Responsible Operator (ORO) in absence of the Manager of Environmental Services
Environmental Services Coordinator	<ul style="list-style-type: none"> • Report to the Manager of Environmental Services • Communicate/liase with the Director, Manager of E.S, GIS & Asset Analyst, Lead Hand and Environmental Services Operators • Respond to and document public complaints • Input lab results and prepare monthly/annual reports • Assist with DWQMS document and records control • Assist with locate services • Assist with communication during emergency situations • Follow up to assess closure of non-conformances and effectiveness of corrective actions 	<ul style="list-style-type: none"> • Recommend changes to QMS • Update and implement document changes to QMS • Be the liaison with the QMS Representative for QMS external auditing process by ensuring that the processes and procedures needed for the QMS are established and maintained • To investigate conformance to the DWQMS
GIS/Asset Analyst	<ul style="list-style-type: none"> • Report to Manager of Public Works • Communicate/liase with all municipal departments with respect to GIS/Asset Management • Update asset inventories and infrastructure mapping • Periodically audit the Corporation DWQMS for conformance • Report findings to the DWQMS Representative 	<ul style="list-style-type: none"> • Recommend changes to QMS

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REFERENCES

QMS Element 4.0 QMS Representative – Notice of Appointment

QMS Element 20.0 Management Review

Table of Revisions

Revision No.	Date (dd/mm/yyyy)	Description of Revision
3	23/09/2022	Environmental Services Coordinator role included in organizational structure, responsibilities and authorities
4	11/01/2023	Update Environmental Services Operator ‘Authorities’ to include: <i>Act as Overall Responsible Operator (ORO) in absence of the Manager of Environmental Services</i> ; removal of this ‘Responsibilities’ from Lead Hand (Lead Hand responsibilities include: <i>All duties of an Environmental Services Operator</i>)
5	28/04/2023	Updated Organization Structure and roles

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QMS Element 10: Competencies	
Revision No. 2	

10.0 COMPETENCIES

10.1 Purpose

To define the competency requirements for personnel performing duties directly affecting drinking water quality and to identify the means needed to meet those competencies.

10.2 Scope

This procedure covers all personnel performing duties that affect drinking water quality.

10.3 Procedure

The Ministry of Environment, Conservation and Parks classified the Strathroy-Caradoc Distribution System as Class III According to O. Reg. 128/04, all operators (not including ORO) are required to possess, at a minimum, a valid OIT certificate in Water Distribution. The ORO must hold, a minimum, a certificate matching the class of the facility.

10.3.1 Identifying Competencies

The following identifies the competencies required of staff whose performance may have a direct impact on drinking water quality. Records show evidence of activities to meet and maintain competencies described in the procedure, and to ensure personnel awareness.

- **Municipal Owners**
Are briefed on operating conditions and are provided updates required by regulations at Council meetings. In addition, the Municipal owner authorizes capital for new and/or maintenance projects relating to the water distribution system.
- **Director of Engineering and Public Works**
Shall possess advance theoretical and working knowledge of administrative skills expected of a senior level manager. In addition, the Director shall possess an intermediate theoretical and working knowledge of the Safe Drinking Water Act and applicable regulations and legislation, and the Municipality of Strathroy-Caradoc drinking water distribution system.
- **Manager of Environmental Services (ORO)**
Shall possess advance theoretical and working knowledge of administrative skills pertaining to the operation and management of the Strathroy-Caradoc Water Distribution System. In addition, the manager shall have advanced knowledge of the Safe Drinking Water Act and applicable regulations, and the Strathroy-Caradoc Waterworks Design and Construction Standards.
- **Lead Hand (Back up ORO/OIC)**
Shall possess advanced theoretical and technical working knowledge of the Strathroy-Caradoc Water Distribution Systems. Shall also possess advanced theoretical and technical working knowledge of the Safe Drinking Water Act and applicable regulations, along the Strathroy-Caradoc Waterworks Design and Construction Standards. Will only act as ORO or OIC if appropriately licensed.

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- **Environmental Services Operators (Back up ORO/OIC)**

Shall maintain a minimum OIT certification for Water Distribution. Employees are encouraged to work towards obtaining certification equal to the level of the facilities. Shall possess superior mechanical/operational skills to trouble-shoot and maintain the water distribution system. Shall document operational conditions, process modifications and have working knowledge of the Safe Drinking Water Act and applicable regulations. Will only act as ORO or OIC if appropriately licensed.

10.3.2 Satisfying Competencies

The following list details the required competencies for operational personnel associated with the Water Distribution System:

- All personnel are required to provide evidence of educational requirements (Grade 12 or equivalent).
- All personnel are required to possess experience, technical knowledge and personnel skills relevant to that specific position and participate in training exercises, as they may be available.
- Personnel are provided pertinent training to ensure staff meet core competencies in addition to the operator training requirements per O. Reg. 128/04.
- Operational Staff must be trained over a 3-year period to the Class III Certification requirement which includes a minimum 42 hours Continuing Education (Director Approved) and 78 hours On-the-Job Practical Training.
- The ORO shall have a minimum Class 2 Water Distribution Certificate.
- The OIC shall have a minimum Class I Water Distribution Certificate.
- Training shall be scheduled by the Manager of Environmental Services.
- The Municipality of Strathroy-Caradoc allocates appropriate funding in the annual budget to provide staff training. At a minimum, the training budget includes funding for legislated and required training to maintain Operator Certification in accordance with Ontario Reg. 128/04.

REFERENCES

Ontario Regulation 128/04

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Table of Revisions

Revision No.	Date (dd/mm/yyyy)	Description of Revision
1	19/02/2020	Updated procedure to include revision table Update to reflect title changes from Water Foreperson to Lead Hand and Water Operators to E.S. Operators
2	23/09/2022	Lead Hand & Environmental Services Operators updated as Backup ORO/OIC

DRINKING WATER QUALITY MANAGEMENT SYSTEM	
QMS Element 11: Personnel Coverage	
Revision No. 4	

11.0 PERSONNEL COVERAGE

11.1 Purpose

To ensure continuous coverage and availability of certified and competent personnel for the drinking water distribution system to address all issues relating to and carrying out necessary duties that directly affect the drinking water quality.

11.2 Scope

This procedure is applicable to all personnel who operate and maintain the water distribution system of the Municipality of Strathroy-Caradoc.

11.3 Procedure

Regular Hours

Administration coverage for the water distribution system is staffed by the Municipality of Strathroy-Caradoc personnel from 8:30 am to 4:30 pm, Monday to Friday. Exceptions are made during statutory holidays, or schedule closings.

The water distribution system is staffed by the Municipality of Strathroy-Caradoc personnel (Environmental Services Operators) from 7:00 am to 3:30 pm, Monday to Sunday. Exceptions are made during statutory holidays.

After Hours

The Lead Hand shall prepare an on-call schedule for operator coverage for the time that the Water Distribution System is unstaffed. The on-call operator shall be assigned on a weekly basis, covering from 3:30 pm to 7:00 am.

The on-call operator is provided with a cell phone to respond to after-hour/weekend/statutory holiday emergencies. When on-call, the operator is required to respond to emergency calls within a reasonable time period.


Water levels in the elevated tank and the chlorine residual at the discharge from the tank are monitored by SCADA. Alarms are sent for high or low levels in the tank, low chlorine residual, or in the event of unauthorized access to the reservoir.

In the event of an alarm, the SCADA dialer will call a 24 hour answering service.

The on-call operator shall determine the nature of the alarm and respond accordingly within a reasonable time of receiving the call.

In the event that the on-call operator does not confirm the alarm call with the answering service, the answering service will follow a call out list for the other Environmental Services Operators which includes the Manager of Environmental Services. As well, the alarm service sends an e-mail to the Manager of Environmental Services of all alarm/dispatch events.

The Manager of Environmental Services is the normal designated ORO. The Lead Hand is the alternate designated system ORO. The ORO will respond as necessary within a reasonable time of being notified.

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The Environmental Services Operators are the designated OIC if they hold a license above OIT. All reported alarms and the resulting action taken shall be recorded in the daily log book.

Staffing Shortages

In the event of emergency conditions which may result in staff shortage, water staff could exercise the provisions in the Municipality of Strathroy-Caradoc Emergency Response Plan to access staff from Middlesex County along with neighboring municipalities. This may also include the deployment of the Middlesex County CERV Team. The initiation of such action would require the Community Control Group to meet and confirm required response measures.

REFERENCES

Municipality of Strathroy-Caradoc Contingency Plan

Log Books

SCADA Monitoring Results

On-Call Schedule

Table of Revisions

Revision No.	Date (dd/mm/yyyy)	Description of Revision
2	25/01/2021	Procedure updated to replace the Utility Clerk for Manager of ES
3	23/09/2022	Procedure updated to reflect regular hours staffing Monday to Sunday
4	28/04/2023	Updated Regular hours to not include Stat days

DRINKING WATER QUALITY MANAGEMENT SYSTEM	
QMS Element 12: Communications	
Revision No. 3	

12.0 COMMUNICATIONS

12.1 Purpose

The purpose of this procedure is to identify the method for communicating the Quality Management System between Top Management and:

- the Owner,
- Operating Authority personnel,
- Suppliers and,
- the Public.

12.2 Scope

This procedure applies to the Owner, Environmental Services Operators, essential suppliers and the public.

12.3 Procedure

The QMS Representative shall ensure that a current version of the Municipal QMS Policy is available to the Municipal Owner, Top Management, Operating Authority staff, suppliers and the public on the Municipality of Strathroy-Caradoc website:

<https://www.strathroy-caradoc.ca/en/city-hall/Policies-and-Documents.aspx>

The QMS Representative shall ensure an electronic copy of the Municipal DWQMS Operational Plan is updated annually and is available to staff. Should a printed copy be made, this document would be considered uncontrolled.

Communication with the Owner

- The QMS Representative shall ensure the Mayor and Council is provided with a report from the Management Review, as per QMS Element 20.0 Management Review Procedure.
- Top Management provides updates to Council and receives information from regular administration meetings and Council meetings.
- Communication with the Mayor and Council may be documented in the Council minutes.
- Other means of communication to and from the Owner is achieved through informal meetings (i.e. direct telephone contact, e-mails, verbal discussions)

Communication with Operating Authority Personnel

- Permanent or temporary employees of the water distribution system shall be provided an overview of the Operational Plan. The Lead Hand has the overall responsibility for ensuring that appropriate training is provided to new staff.
- A digital copy of the Operational Plan and supporting documents shall be available to staff on the EPW Network.

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QMS Element 12: Communications	
Revision No. 3	

- Other means of communication to and from the Operating Authority personnel is achieved through e-mail, verbal discussions, staff meetings, presentations and internal audits.

Communication with Suppliers

- Communication to and from essential suppliers, services and contractors can be achieved verbally, through e-mail and written correspondence.
- Essential suppliers, services and contractors shall receive a notification letter by e-mail regarding Municipal QMS relevant information. Essential suppliers, services and contractors shall e-mail confirmation of their acknowledging receipt of the Municipal DWQMS requirements. This documentation shall be circulated to suppliers, services and contractors every three years.

Communication with the Public

- Consumers may be informed of the QMS and any significant changes by the Municipality of Strathroy-Caradoc website.
- Customer complaints, inquiries, and concerns are accepted from the public through e-mail, phone calls, public portal or in-person. The Water Complaint Procedure for Receiving and Recording will be utilized.
- Annual reports, required by O. Reg. 170/03 shall be available as required.
- Notification of water system emergencies and alerts may be distributed via newsletters, handouts, website, radio station or in-person.

REFERENCES

QMS Element 20.0 Management Review Procedure
Council Agenda and Minutes

Table of Revisions

Revision No.	Date (dd/mm/yyyy)	Description of Revision
1	19/02/2020	Updated procedure to include revision table; Updated to reflect title changes from Water Foreperson to Lead Hand
2	22/01/2021	Notification letter to supplier is circulated every three years
3	23/09/2022	Term Water Operator updated to Environmental Services Operator

DRINKING WATER QUALITY MANAGEMENT SYSTEM QMS Element 13: Essential Supplies & Services	
Revision No. 3	

13.0 ESSENTIAL SUPPLIES AND SERVICES

13.1 Purpose

To identify the supplies and services deemed essential to the delivery of safe drinking water and to describe how the quality of these services is ensured.

13.2 Scope

The purpose of this procedure is to identify the process for:

- the selection of suppliers
- how purchased product requirements are communicated to suppliers
- how purchased products are verified

13.3 Procedure

New Essential Supplier Approval

The Manager of Environmental Services or designate will send the potential supplier/contractor an email notifying that the Municipality has a QMS along with the QMS Policy. The essential supplier/contractor is required to provide email confirmation, acknowledging receipt and necessary documents demonstrating requirements are met. The Manager of Environmental Services or designate will review the confirmation and documentation before the supplier is used.


Existing Supplier Control

All suppliers are selected upon their ability to meet and maintain the Municipality of Strathroy-Caradoc requirements for purchased product and services. Every three years, an information update will be sent via email to the Essential Suppliers/Contractors to confirm they are aware of Strathroy-Caradoc's DWQMS.

Product specifications, standards and/or descriptions are indicated on the purchasing documentation as appropriate. Note: Supplier packing slips, Bill of Lading and Certificates of Analysis are acceptable purchasing documentation.

Suppliers whose products may affect drinking water quality are required to provide evidence that their products meet NSF Standards/ANSI 60 for drinking water treatment chemicals and NSF Standard/ANSI 61 for drinking water system components.

- Chlorine shall be supplied to AWWA/NSF Standards.
- Calibration services may be performed by either certified calibration technicians or trained Environmental Services operators using fully traceable equipment, standards, and/or instrumentation (preferably traceable to NIST, as applicable).
- Only MECP accredited laboratories shall be contracted to provide analysis of drinking water samples.

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- All engineering firms shall provide an engineer's seal with any reports, plans or drawings relating to construction at, or performance of the drinking water distribution system.
- Contractors are informed about the QMS and specific requirements related to the service they are providing, where the service could affect drinking water quality (i.e. disinfection of equipment or structures, need to maintain continuity of treatment processes, etc.).
- Environmental Services Operators verify documentation upon receipt of chemicals to ensure that supplies meet standards applicable before they are unloaded.

Purchasing and Procurement Procedure

The Municipality of Strathroy-Caradoc has a Purchasing Policy for the Procurement of Goods and Services. When an Operator receives goods they are to initial the packing slip to be attached to the corresponding invoice. Copies of the invoice and packing slips are maintained by the Municipality's Financial Services Department.

REFERENCES

Essential Supplier and Services List –Appendix A in the Contingency Plan

Municipality of Strathroy-Caradoc Bylaw No. 56-14, Amendment to the Purchasing Policy

Table of Revisions

Revision No.	Date (dd/mm/yyyy)	Description of Revision
1	19/02/2020	Updated procedure to include revision table; Purchasing and Procurement procedure updated
2	25/01/2021	Added new Essential Supplier approval procedure
3	28/04/2023	Updated Reference to current purchasing policy

DRINKING WATER QUALITY MANAGEMENT SYSTEM QMS Element 14: Review & Provision of Infrastructure	
Revision No. 3	

14.0 REVIEW AND PROVISION OF INFRASTRUCTURE

14.1 Purpose

The purpose of this procedure is to ensure once every calendar year, a review of the adequacy of the infrastructure and the resources necessary to operate and maintain the waterworks is completed.

14.2 Scope

This procedure is applicable to the water distribution infrastructure owned, maintained and operated by the Municipality of Strathroy-Caradoc.

14.3 Procedure

Infrastructure Review

The Engineering and Public Works Department maintains plans to determine how the area will grow, both short and long term, and where they believe infrastructure and resources will be necessary.

Each calendar year, the Manager of Environmental Services shall review the adequacy of the drinking water distribution system infrastructure considering the following information:

- Previous capital plans
- Operational performance indicators such as watermain and valve age distribution, watermain breaks, adverse water quality incidents, leak detection, service connections
- Drinking water quality trends
- Watermain replacement and rehabilitation
- Maintenance records such as hydrant and valve inspections
- Climate change considerations
- Risk assessment outcomes

The Manager of Environmental Services and the Director of Engineering and Public Works shall prepare a ten-year Capital plan in preparation for the water licence and permit renewal. The ten-year Capital Plan will identify infrastructure needs (i.e. replacements, upgrades, new). Each year for the capital budget, a one year plan is developed taking into consideration the infrastructure improvements in the previously prepared ten-year capital plan and any new needs that have arisen. This one year plan will be taken to Council for approval.

Infrastructure Provision

The Director of Engineering and Public Works will include the proposed Capital Plan as part of the capital budgeting process for Council consideration and approval.

Infrastructure capital projects may be designed, constructed and/or inspected by the department of Engineering and Public Works or contracted to engineering consultants and/or construction contractors.

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A summary report will be provided to Council in accordance with Ontario Reg. 170/03 detailing the infrastructure that has been installed, replaced and/or upgraded. In addition, the report will also be available to the public on request.

REFERENCES


Ten year Capital Plan

Annual Capital Budget

Infrastructure Studies and Master Plans

Table of Revisions

Revision No.	Date (dd/mm/yyyy)	Description of Revision
1	19/02/2020	Updated procedure to include revision table
2	25/01/2021	Four-year Capital Plan updated to 10-year Financial Plan
3	25/02/2021	Updated procedure relating to infrastructure review to reflect 10 year plan, and annual capital budget

DRINKING WATER QUALITY MANAGEMENT SYSTEM QMS Element 15: Infrastructure Maintenance, Rehabilitation & Renewal	
Revision No. 5	

15.0 INFRASTRUCTURE MAINTENANCE, REHABILITATION AND RENEWAL

15.1 Purpose

To summarize water service's infrastructure maintenance, rehabilitation and renewal programs.

15.2 Scope

This procedure is applicable to the Environmental Services Team of the Municipality of Strathroy-Caradoc.

15.3 Procedure

Planned Maintenance

Standard Operating Procedures (SOP) are available for some of the maintenance activities. Environmental Services Operators can consult the SOP, if required to complete the maintenance activities.

Any records generated are maintained in accordance with retention times identified in the QMS Element 5.1 Document Control Procedure.

All planned maintenance is scheduled and communicated to staff by the Lead Hand.

- Annual flushing programs including inspection, maintenance and painting (as required).
- Valve exercising program. Operators will complete a valve report anytime the valve is operated.
- Chamber maintenance

Unplanned Maintenance

Unplanned maintenance is conducted by the Environmental Services Operators or a Contractor if required. All unplanned maintenance activities are reported to the Manager of Environmental Services.

The Lead Hand has the overall responsibility for managing unscheduled maintenance in the system as per operational requirements; however, maintenance responsibilities are delegated to appropriate personnel as a part of job position duties. Unplanned maintenance activities reported during after hours and weekend/holidays are resolved by the designated personnel.


When an unscheduled activity is requested, the Lead Hand may designate an Operator to complete the maintenance activity, and the Operator is to complete the Water Distribution Maintenance Form (Form ES 04).

Once the work is complete, the Operator will sign the form and forward it to the Lead Hand for review and signature, then the Lead Hand will save the form electronically.

When the unscheduled activity is complete, the work is entered into the appropriate log book and records are maintained as per QMS Element 5.2 Records Control Procedure.

Some unplanned maintenance activities includes:

- Watermain breaks

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- Main Valve leaks
- Service leaks
- Frozen services
- Hydrant repairs
- Curbstop repairs
- Water customer complaints (Form ES 05) *

**Although water customer complaint calls are part of the unplanned maintenance activities, they are conducted following the Water Complaint Procedure.*

Planned and unplanned maintenance performed is communicated to the Manager of Environmental Services for review during the Management Review meetings.

Renewal and Rehabilitation

Information about unplanned maintenance events (regarding watermain breaks, main valve leaks, service leaks, frozen services and customer complaints) are reported daily by the Environmental Services Operators and they are summarized and mapped by the GIS/Asset Analyst. These records are summarized by the department of Engineering and Public Works for use during the annual budgeting process and to determine the effectiveness of the maintenance program. An annual Capital Budget is maintained by the Director of Engineering and Public Works that includes water capital work. The Capital Budget is reviewed at a minimum of once a calendar year. This allows the Municipality to track progress of the planned work.

All other renewal and/or rehabilitation issues are brought to the attention of the Owner by the Director of Engineering and Public Works during the annual budgeting process or regular Council Meetings and where applicable, are incorporated as part of the Capital Budget that is updated annually. Annual review of water rates occurs and can be set to support renewal and rehabilitation projects. The budget is forwarded to Council and it is the responsibility of Council to approve capital and/or operating budget.

REFERENCES

Form ES 04 Water Distribution Maintenance

Form ES 05 Customer Complaint

S-C Water Supply, Storage and Distribution System Operational Plan and Contingency Plan
Plan Maintenance Records

Log Books

Annual Capital Budget


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Revision No. 5	

Table of Revisions

Revision No.	Date (dd/mm/yyyy)	Description of Revision
3	25/02/2021	Updated renewal and rehabilitation process to include annual capital budget
4	23/09/2022	Term Water Operator updated to Environmental Services Operator
5	25/04/2023	Procedure updated to reflect Internal Document updates (forms/documents to begin with ES, followed by sequential numbering)

DRINKING WATER QUALITY MANAGEMENT SYSTEM	
QMS Element 16: Sampling, Testing & Monitoring	
Revision No. 2	

16.0 SAMPLING, TESTING AND MONITORING

16.1 Sampling Procedure

16.1.1 Purpose

To define sampling activities conducted by the Municipality of Strathroy-Caradoc to assure compliance to Ontario Regulations in the distribution of safe drinking water.

16.1.2 Scope

This procedure is applicable to all Environmental Services Operators who perform sampling of the water distribution system.

16.1.3 Procedure

All sampling programs carried out on the Municipality of Strathroy-Caradoc's water distribution system shall be coordinated by the Lead Hand. All sampling, testing and monitoring activities shall be conducted in accordance with O. Reg. 170/03.

Samples are categorized as follows:

- Samples for on-site analysis (Free Chlorine, pH, etc.)
- Continuous SCADA sampling (Free Chlorine, flow monitoring)
- Microbiological samples (Total Coliform, E. Coli, and HPC)
- Chemical samples (Lead, Trihalomethanes, Alkalinity, Halo Acetic Acids)

Sampling activities include distribution samples.

- Physical samples are retrieved from various points in the distribution system by operational personnel.
- The SCADA system conducts continuous sampling.
- At a minimum, samples are taken in compliance with all applicable Ontario Regulations.

Physical samples shall be collected by certified operators only. Proper care shall be taken to ensure that contaminants are not introduced to the sample during collection by the operator.

Operators shall follow the sample collection protocol as documented in Section 1 of "Standard Methods for the Examination of Water and Wastewater – 20th Edition".

The results of all SCADA sampling shall be printed and filed electronically by Environmental Services Operators on a daily basis. The monthly data is available for viewing on the EPW Drive.

The results of all microbiological and chemical samples (Accredited Laboratory Results) shall be retained digitally in the EPW Network.

Overall Responsible Operator (ORO)/Operator in Charge (OIC) shall follow the appropriate protocol for reporting to the Ministry of Environment, the Health Unit and local authorities in case of any adverse water samples and corrective actions.

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SCADA Based Sampling Records

PRIMARY SCADA SAMPLING POINTS		
SAMPLE	PROCESS	DAILY REPORT
Strathroy Inlet Flow (L/s)	Reservoir	Yes
Strathroy Inlet Free Chlorine (mg/L)	Reservoir	Yes
Strathroy Zone #1 Flow (L/s)	Reservoir	Yes
Strathroy Zone #1 Free Chlorine (mg/L)	Reservoir	Yes
Strathroy Zone #2 Flow (L/s)	Reservoir	Yes
Strathroy Zone #2 Free Chlorine (mg/L)	Reservoir	Yes
Strathroy Distribution Chlorine (mg/L)	Strathroy Tower	Yes
Mt. Brydges Inlet Flow (L/s)	Oriole Drive MS	Yes
Mt. Brydges Inlet Chlorine (mg/L)	Oriole Drive MS	Yes
Mt. Brydges Distribution Flow (L/s)	Reservoir	Yes
Mt. Brydges Reservoir Inlet Chlorine (mg/L)	Reservoir	Yes
Mt. Brydges Reservoir Outlet Chlorine (mg/L)	Reservoir	Yes
Mt. Brydges Distribution Chlorine (mg/L)	Railroad Rd. Tower	Yes

Manual Sampling Records

Accredited Laboratory Reports – Bacteriological and Chemical
Chlorine Residuals and Analyzer Calibrations

16.2 Monitoring Procedure

16.2.1 Purpose

To ensure monitoring is conducted to provide safe drinking water for the Municipality of Strathroy-Caradoc's drinking water distribution system.

16.2.2 Scope

This procedure is applicable to all personnel who operate and maintain the water distribution system.

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16.2.3 Procedure

Environmental Services Operators shall monitor the water distribution system to ensure that operational parameters are being maintained.

Monitoring methods include:

- SCADA
- Visual confirmation of monitoring equipment readings
- Routine testing

The Environmental Services Operators shall monitor SCADA displayed data and conduct visual equipment/process monitoring during regular working hours (7:00am to 3:30pm – Monday to Sunday, excluding Statutory Holidays).

The SCADA system monitors process parameters and/or water quality characteristics at the connection point, reservoir outlet and specified point in distribution.

In the event that maintenance is required, the operator shall take the necessary action to ensure the maintenance requirements are reported to the Lead Hand and that the on-going supply of safe drinking water is maintained.

REFERENCES

Daily Log Books


SCADA Monitoring Results (Daily)

SGS Bacti Results

Chlorine Residuals for weekly Bacti testing

Table of Revisions

Revision No.	Date (dd/mm/yyyy)	Description of Revision
1	19/02/2020	Updated procedure to include revision table; Updated to reflect title changes from Water Foreperson to Lead Hand and Water Operators to E.S. Operators
2	23/09/2022	Regular working hours updated to reflect Monday to Sunday

DRINKING WATER QUALITY MANAGEMENT SYSTEM QMS Element 17: Measurement & Recording Equipment Calibration & Maintenance	
Revision No. 3	

17.0 MEASUREMENT & RECORDING EQUIPMENT CALIBRATION & MAINTENANCE

17.1 Calibration Procedure

17.1.1 Purpose

To define the process used by the Municipality of Strathroy-Caradoc staff and /or its contractors to perform calibration of on-line measuring and recording devices.

17.1.2 Scope

The procedure is applicable to measuring and recording devices used by the Municipality of Strathroy-Caradoc for monitoring potable water in the distribution system.

17.1.3 Procedure

Measurement and recording equipment is maintained and calibrated as per equipment manufacturer's specifications or as required by O.Reg.170; whichever is more frequent.

The calibration of on-line measurement and recording devices is divided into two categories:

- Devices calibrated by an Environmental Services Operator
- Devices calibrated by a Certified Contractor

Devices calibrated by an Environmental Services Operator

All devices calibrated by the operator are to manufacturer's specifications. Current manuals are maintained at the Environmental Services building.

All calibration results shall be recorded on the Chlorine Residuals and Analyzer Calibrations Form DC28. Devices that are suspect, or no longer capable, shall be removed from service and replaced.

Devices calibrated by a Certified Contractor


The Certified Contractor shall provide evidence of qualifications to the Municipality of Strathroy-Caradoc when contractor is called to do calibrations. These documents will be stored on the EPW Drive.

Records are provided for all devices calibrated by a Certified Contractor. Records of calibration are saved on the EPW drive.

The name(s) of certified contractor(s) for calibration shall appear on the Contact and Essential Supplier/Service List.

The Lead Hand is responsible for ensuring that the calibration is undertaken and the forms are completed for in-house and/or undertaken by the designated outside contractors and records are provided.

Environmental Services Operators are responsible for undertaking maintenance (e.g. clean probes, electrolytes) and recording this in the log book. Operators may make changes to equipment to get


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it back into calibration as per manufacturer's specifications and/or as required by O.Reg.170. The Lead Hand is contacted by the Environmental Services Operators to inform the maintenance work was completed.

Strathroy-Caradoc Water Supply, Storage and Distribution System Operational Procedures are used to inform an operator about the standard operation practices regularly carried out within the system.

MEASUREMENT & RECORDING EQUIPMENT CALIBRATION & MAINTENANCE SCHEDULE

CALIBRATION EQUIPMENT	CALIBRATED BY/METHOD	CALIBRATION FREQUENCY	SCHEDULING
Handheld PH Meter	E.S. Operator/Manufacturer's specifications	Before the start of testing each day	Lead Hand
On-Line Free Chlorine Analyzer	E.S. Operator/Manufacturer's specifications	Weekly/As needed basis	Lead Hand
Hach Pocket Colorimeter 2 Free/Total CL2	E.S. Operator/Manufacturer's specifications	Monthly	Lead Hand
Strathroy Tower: <ul style="list-style-type: none"> Prominent Chlorine Analyzer DCA (1) 	E.S. Operator/Certified Contractor/Manufacture's specifications	Annually	Lead Hand
Strathroy Reservoir: <ul style="list-style-type: none"> Prominent Chlorine Analyzer DCA (2) Rosemount 8712DR 12N0M4 Flow Meters (2) Signature 2408 for pressure (2) 	E.S. Operator/Certified Contractor/Manufacture's specifications	Annually	Lead Hand
Strathroy Tower: <ul style="list-style-type: none"> Rosemount -1151 Smart for level (1) 	Certified Contractor/Manufacture's specifications	Annually	Lead Hand
Mt. Brydges Station: <ul style="list-style-type: none"> Rosemount Flow Meter (1) Prominent Chlorine Analyzer DCA (1) Rosemount 2088 for pressure (1) 	E.S. Operator/Certified Contractor/Manufacture's specifications	Annually	Lead Hand
Mt. Brydges Reservoir: <ul style="list-style-type: none"> Endress & Hauser Promag 53 Flow Meter (1) Bristol Babcock 2808 for outgoing pressure (1) 	E.S. Operator/Certified Contractor/Manufacture's specifications	Annually	Lead Hand

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<ul style="list-style-type: none"> Rosemount 2088 for incoming pressure (1) Prominent DIC CL2 Analyzer (2) 			
Mt. Brydges Tower: <ul style="list-style-type: none"> Bristol Babcock 2808 for level and pressure Prominent Chlorine Analyzer DCA (1) 	E.S. Operator/Certified Contractor/Manufacture's specifications	Annually	Lead Hand

REFERENCES

Contacts and Essential Supplier/Services List - Appendix A of the Contingency Plan
 Strathroy-Caradoc Water Supply, Storage and Distribution System Operations Manual
 Chlorine Residuals and Analyzer Calibration
 Records of Calibration by Certified Contractors/E.S. Operators

Table of Revisions

Revision No.	Date (dd/mm/yyyy)	Description of Revision
1	19/02/2020	Updated procedure to include revision table Updated to reflect title changes from Water Foreperson to Lead Hand and Water Operators to E.S. Operators
2	25/01/2021	Certified contractor qualifications updated and manufacturer/type
3	02/02/2022	Calibration equipment updated

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18.0 EMERGENCY MANAGEMENT

18.1 Purpose

This procedure describes how the Municipality of Strathroy-Caradoc maintains a state of emergency preparedness including:

- Processes for emergency response and recovery
- Emergency response training and testing requirements
- Owner and OA responsibilities during emergency situations
- References to municipal emergency planning measures, as appropriate
- Emergency communication protocol with an up-to-date list of emergency contacts
- References to municipal emergency planning measures

18.2 Scope

The procedure is applicable to all personnel who operate and maintain the water distribution system.

18.3 Procedure

Procedures for Emergency Conditions can be found in the Contingency Plan manual.

Conditions covered may include:

- Adverse water quality
- Equipment Failure
- Security Breach
- Frozen Watermain
- Hydrant Damage
- Contamination
- Pipeline breaks
- Fire or Explosion
- Other emergency situations

Identification of Emergency Situations or Service Interruptions

On an annual basis the Lead Hand, will review the list of emergency situations or service interruptions that have been identified and examine current operations to determine if additional emergency situations or service interruptions exist.

In addition, during the risk assessment process is another opportunity where the review process may identify emergency situations or service interruptions that can be added to the list of emergency situations.

The QMS Representative is responsible for maintaining and updating the records and associated documents.

Process for Emergency Response and Recovery

Based on the emergencies identified the Lead Hand is responsible for ensuring that Emergency Response Plans are developed.

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The Contingency Plan outline the roles and responsibilities for various staff and the activities related to the response and recovery from the emergency situation or service interruption.

The Municipality of Strathroy-Caradoc has a corporate Emergency Response Plan that outlines communication procedures during emergency situations and the roles and responsibilities of the Owner depending on the level of emergency.

The Director of Engineering and Public Works or designate is responsible for making contact to initiate corporate communications for emergencies that have escalated to a corporate level of response.

For escalation of emergencies, the Contingency Plan for the drinking water system and the Emergency Communication Protocol should be referred to as they provide the emergency communication protocol for situations that have potential Water impacts. The emergency list of contacts is included in the Contingency Plan.

Emergency Response Training and Testing Requirements

The Manager of Environmental Services is responsible for ensuring that emergency response training is undertaken by appropriate staff.

The training is tracked for staff on training log sheets.

The Emergency Response Plans will be tested through desktop exercises and through the responses to actual emergencies.

In addition, a debriefing after larger scale emergencies will be undertaken by the Manager of Environmental Services and may include other applicable staff.

Periodically the emergency procedures (response and recovery) will be evaluated and modifications made to the procedures where required based on the review and/or debriefing following emergency situations.

Emergency Communication Protocol

- **Emergency Notification: Level 1**

Level 1 Emergencies are generally those that can be addressed by the Operating Authority's own resources and do not require notification beyond that dictated in Ontario Regulation 170/03, *Schedule 16, Reporting Adverse Results and Other Problems*.

Level 1 Emergencies can typically be resolved by following the applicable Contingency Plan Procedures.

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- **Emergency Notification: Level 2**

Level 2 Emergencies are generally those that can be addressed by the Operating Authority's own resources, but may require additional outside resources as deemed necessary. No additional notification beyond that dictated in Ontario Regulation 170/03, *Schedule 16, Reporting Adverse Results and Other Problems*. Level 2 emergencies require the notification of the owner and require the involvement of the Director of Engineering and Public Works.

If a Boil Water Advisory (BWA) or Drinking Water Advisory (DWA) is to be issued, additional resources as directed by the Public Health Inspector (Medical Officer of Health) may be needed. If an alternate water supply is to be made available for the duration of the incident, additional staff may be needed to secure a water supply and deliver to affected water consumers as soon as is practical.

Level 2 Emergencies can typically be resolved by following the requirements of the Contingency Plan

When issuing a BWA or DWA, the applicable Standard Operating Procedures are to be followed. If an event reaches this level, there is a need for both an effective operations response and effective issues management.

- **Emergency Notification: Level 3**

Level 3 Emergencies are those that cannot be addressed by the Operating Authority's resources. Additional resources may include, but are not limited to, assistance from outside work forces, such as regulators, emergency responders. Notification beyond Ontario Regulation 170/03, *Schedule 16, Reporting Adverse Results and Other Problems* is required, including contacting the Owner as per procedures found in Emergency Response Manual.

If a large scale (typically greater than 200 residences) BWA or DWA is to be issued, additional resources from the Public Health Inspector will be needed. If an alternate water supply is to be made available for the duration of the incident, additional staff will be needed to secure a water supply and deliver to affected water consumers as soon as is practical. It is possible for an event to initially be responded to as a level 1 or 2, but continuing circumstances could elevate it to a level 3 (e.g., adverse water quality incident results in a boil water order/advisory).

Examples of a Level 3 emergency include:

- Potential or Actual Unsafe Water (Large Scale Boil Water Order/Advisory)
- Community emergency affecting water supply/distribution
- Large scale water treatment plant or system failure
- Catastrophic watermain break
- Activities that will attract media attention whether warranted as an emergency or not; and
- Loss of service/inability to meet demand

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Level 3 Emergencies will require the coordination of several groups/agencies, which may include:

- Fire Chief
- Public Health Inspector (Medical Officer of Health)
- Ministry of the Environment
- Owner


Level 3 Emergencies will require coordination between Operating Authority Emergency Response Plan and Owners Emergency Response Plan.

The following chart is to be used to guide in determining which emergency response level is applicable and as such, which resources may be required and will require notification. Not all incidents listed will require all noted resources and needs to be addressed on a case-by-case basis.

Emergency Level	Incident Type Examples	Potential Resources Required Based on Incident Type	Response Guidance	Person/Group Requiring Initial Notification (Dependent on Incident Type)	Person/Group Responsible for Coordinating Response
1	<p>Single Adverse Test Result</p> <p>Localized Watermain Break</p> <p>Minor Equipment Malfunctions</p>	<p>Operations Staff</p> <p>Public Health Inspector</p> <p>Owner</p> <p>Ministry of Environment, Conservation and Parks</p>	<p>Emergency Response Plan</p> <p>Equipment manual</p>	<p>Medical Officer of Health</p> <p>Ministry of Environment, Conservation and Parks</p>	<p>Manager of Environmental Services or Designate</p>

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2	<p>Multiple Adverse Test Results</p> <p>Boil Water Advisories</p> <p>Drinking Water Advisory</p> <p>Loss of Key/Transmission Watermains</p> <p>Multiple Plant Equipment Malfunctions/Failures</p> <p>Hazardous Material Spills</p>	<p>Operations Staff</p> <p>Public Health Inspector</p> <p>Owner</p> <p>Ministry of Environment, Conservation and Parks</p> <p>BWA/DWA Notification Resources (notices and delivery Staff)</p> <p>Outside Contractors and Equipment</p> <p>Alternate Water Supply</p>	<p>Emergency Response Plan</p> <p>Equipment manual</p> <p>Municipal Emergency Response Plan</p>	<p>Medical Officer of Health</p> <p>Ministry of Environment, Conservation and Parks</p> <p>Owner</p> <p>Fire Chief</p>	<p>Manager of Environmental Services or Designate</p> <p>Director of Engineering and Public Works</p>
3	<p>Multiple Adverse Test Results</p> <p>Large Scale Boil Water Advisories</p> <p>Large Scale Drinking Water Advisory</p> <p>Large Scale Loss of Key/Transmission Watermains</p> <p>Fire/Large Scale Multiple Plant Equipment Malfunctions/Failures</p> <p>Large Scale Hazardous Material Spills</p>	<p>Operations Staff</p> <p>Public Health Inspector</p> <p>Owner</p> <p>Ministry of Environment, Conservation and Parks</p> <p>BWA/DWA Notification Resources (notices and delivery Staff)</p> <p>Outside Contractors and Equipment</p> <p>Alternate Water Supply</p>	<p>Emergency Response Plan</p> <p>Equipment manual</p> <p>Municipal Emergency Response Plan</p>	<p>Medical Officer of Health</p> <p>Ministry of Environment, Conservation and Parks</p> <p>Owner</p> <p>Fire Chief</p>	<p>Manager of Environmental Services or Designate</p> <p>Director of Engineering and Public Works</p>

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REFERENCES

Strathroy-Caradoc Water Supply, Storage and Distribution System Operations Manual and Contingency Plan
Emergency Contact List – Appendix A of the Contingency Plan

Table of Revisions

Revision No.	Date (dd/mm/yyyy)	Description of Revision
1	19/02/2020	Updated procedure to include revision table

DRINKING WATER QUALITY MANAGEMENT SYSTEM QMS Element 19: Internal Audits	
Revision No. 4	

19.0 INTERNAL AUDITS

19.1 Purpose

To ensure that the QMS meets or exceeds the requirements of the Standard to confirm it is operating effectively.

19.2 Scope

This procedure is applicable to Municipality of Strathroy-Caradoc's Environmental Services staff that fall under the scope of the DWQMS.

19.3 Procedure

Internal audits of the QMS shall be conducted to confirm that the QMS meets or exceeds the requirements of the DWQMS and that it is effectively implemented and maintained.

Audit Schedule

Each element of the QMS for the drinking water system must be audited a minimum of once per calendar year. Additional audits can be scheduled based on the importance of the process or area, or in response to previous audit results (internal and external).

The Lead Auditor, responsible for overseeing the internal audit process, creates an Internal Audit Agenda (Form ES 06). The Internal Audit Agenda is sent via e-mail to the QMS Representative and the Manager of Environmental Services for approval.

The number and frequency of the audits shall be identified in the internal audit schedule.

Audit Preparation and Opening


The Lead Auditor prepares an Internal Audit Agenda (Form ES 06) and starts the Internal Audit Report (Form ES 08), which includes the scope/audit criteria, attendance names and procedure/questions of the area that are being audited. A copy of the procedures with the points highlighted that are going to be checked may be attached to the agenda and referenced for the audit.

The Lead Auditor may conduct an opening meeting to review the scope of the audit. The Lead Auditor may also confirm the date and location of the closing meeting.

Conducting the Audit

The Lead Auditor shall review records and conduct interviews with the personnel responsible for the functional area in order to determine conformance of the QMS to the requirements of the DWQMS using the Internal Audit Agenda (Form ES 06).

The Lead Auditor shall note instances of conformance and non-conformance.

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- The Internal Audit Report contains Appendix “C” Interview Checklist (Form ES 08). If an item marked “NO” in evaluation section it means a condition was found and may be annotated a NC or OFI.
- All items annotated with an “NC” shall be recorded in the Non-Conformities Section 2.2 on the Internal Audit Report (Form ES 08).
- All items annotated with an “OFI” shall be recorded in the Opportunities for Improvement Section 2.3 on the Internal Audit Report (Form ES 08).

The Lead Auditor shall advise the team audited of any Non-Conformances and Opportunities for Improvement discovered at the end of the Audit. The Lead Auditor shall complete the summary of findings on the Internal Audit Report (Form ES 08).

Closing Audit

During the closing meeting, the Lead Auditor shall identify the positive findings, the non-conformances and Opportunities of the portion of the QMS audited.

The Lead Auditor shall:

- Thank the staff for their cooperation
- Review documented observations (effective, needs improvement, unsatisfactory)
- Ensure the issue is understood and receive agreement on response date for the Corrective Action for each finding with the person responsible for the area audited
- Record the Corrective Action Report number on the Audit Report and ensure audit results are understood

Audit Report

The Lead Auditor shall provide an Internal Audit Report (Form ES 08) of the findings and fill out any Corrective Actions that may be required from the audit. The report has to be signed by the Lead Auditor.

The report shall be saved electronically on the EPW drive for review by the Manager of Environmental Services and QMS Representative.

The Internal Audit Report (Form ES 08), Internal Audit Agenda (Form ES 06), and Corrective Action Report & Log (Form ES 09) shall be filed in the audit file maintained by the QMS Representative.

Audit Follow-Up

The Lead Auditor will make sure that the follow up audits are carried out to verify that the action has been taken and is effective. The results of the follow-up are recorded in the original Internal Audit Report (Form ES 08) and by the QMS Representative on the Corrective Action Report & Log (Form ES 09).

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The reviews of the internal audits and the follow-up audits are reviewed by management at the Annual Management Review meetings, or more frequently if required.

REFERENCES

Form ES 06 Internal Audit Agenda
Form ES 08 Internal Audit Report
Form ES 09 Corrective Action Report & Log
QMS Element 21.0 Continual Improvement Procedure

Table of Revisions

Revision No.	Date (dd/mm/yyyy)	Description of Revision
2	26/04/2023	Procedure updated to reflect Internal Document updates (forms/documents to begin with ES, followed by sequential numbering)
3	23/01/2024	Updated name of form ES 06, removed ES 07 Internal Audit Checklist
4	30/01/2025	Updated wording to reflect new forms, wording and clarify documentation

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QMS Element 20: Management Review	
Revision No. 3	

20.0 MANAGEMENT REVIEW

20.1 Purpose

The purpose of this procedure is to define the process for the review of the effectiveness of the DWQMS by Top Management.

20.2 Scope

This procedure is applicable to the Municipality of Strathroy-Caradoc Environmental Services.

20.3 Procedure

Preparation

Management of the Municipality of Strathroy-Caradoc shall review the DWQMS once per calendar year, at a minimum, to stay informed and to ensure it is:

- Suitable to operators,
- Adequately managing quality issues and meeting the DWQMS and internal requirements,
- Performing this management effectively and
- Adequate resources are provided.

If Top Management does not feel the QMS is meeting these criteria, changes are recommended and resources are allocated to make improvements.

A formal management review shall be included in the internal audit schedule and be conducted at least once every calendar year.

The QMS Representative is responsible for:

- Establishing the date for the annual management review meeting,
- Forwarding notification of the meeting to participants and,
- Forwarding the agenda for the meeting to the participants.

At a minimum, the CAO, the Director of Engineering and Public Works and the Manager of Environmental Services Department must be in attendance at the Manager Review meeting. The Internal Auditor, Environmental Services Coordinator and Environmental Services Operators may participate in the meeting at the request of the QMS Representative.

The QMS Representative shall prepare the agenda (Form ES 10) with the following items to be evaluated during the management review:

- a) Incidents of regulatory non-compliance
- b) Incidents of adverse drinking water tests
- c) Deviations from critical Control Point limits and response actions
- d) The effectiveness of the risk assessment process
- e) Internal and third-party Audit results
- f) Results of emergency response testing
- g) Operational performance
- h) Raw water supply and drinking water quality trends
- i) Follow-up on action items from previous management reviews

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- j) The status of management action items identified between reviews
- k) Changes that could affect the Quality Management System
- l) Consumer feedback
- m) The resources needed to maintain the Quality Management System
- n) The results of the infrastructure review
- o) Operational Plan currency, content and updates, and
- p) Staff suggestions

Review Process

Each input item shall be reviewed to identify if, where, and when improvements to the QMS and its procedures are required.

The QMS Representative shall make note of any changes, deficiencies or action items required during the course of the review. All actions shall identify an individual responsible and the proposed timeline for implementation.

Review Output

Minutes from the Management Review shall be prepared by the QMS Representative and submitted to Top Management.

The minutes shall include:

- The date of the Management Review and the name of attendees,
- Identification of specific agenda items,
- Any identified deficiencies, decisions and potential actions, along with the individual responsible and proposed implementation timeline, and,
- Recommendations for any resource needed for maintenance or improvement of the QMS.

Records of Management review meetings shall be provided to Council annually.

REFERENCES

Form ES 10 Management Review Agenda and Meeting Minutes

Reports on QMS to Council

Table of Revisions

Revision No.	Date (dd/mm/yyyy)	Description of Revision
1	19/02/2020	Updated procedure to include revision table Updated to reflect title changes from Water Operators to E.S. Operators
2	23/09/2022	Updated to include position of Environmental Services Coordinator
3	26/04/2023	Procedure updated to reflect Internal Document updates (forms/documents to begin with ES, followed by sequential numbering)

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21.0 CONTINUAL IMPROVEMENT

21.1 Purpose

To describe the activities undertaken for the continual improvement of the drinking water quality management system.

21.2 Scope

This procedure is applicable to all personnel who operate and maintain the Municipality of Strathroy-Caradoc water distribution system.

21.3 Procedure

Continual Improvement Opportunities

The Environmental Services operations strive to continually improve the effectiveness of its QMS through the use of non-compliance, non-conformance opportunities for improvement, best management practices and preventative actions. Continual improvement will be used to identify opportunities for improvement.

Best Management Practices

MECP's best management practices document (when published, at least once every 36 months, available on www.ontario.ca/drinkingwater.) will be reviewed and considered. If applicable the best management practice will be entered into the Corrective Action Report and Log. Type of finding will be labelled as BMP.

Corrective Action Request

Corrective Action involves taking measures to eliminate causes of identified quality problems to ensure the problems do not recur. Corrective Action may be initiated as a result of the following indicators of a breakdown in the Quality Management System:

- All non-conformances resulting from internal or external audits
- Opportunities for Improvement from internal or external audits
- Management Reviews
- Deviations from the Critical Control Limits
- MECP's inspection (opportunities for improvement and best practices)
- Risk assessment
- Incident debriefing

Preventative Actions

Preventative actions will be identified and implemented to eliminate the occurrence of potential non-conformities in the Quality Management System. The QMS representative or Employees may submit written suggestions or ideas any time using the Continual Improvement Opportunities document (Form ES 11). Each suggestion or idea will be reviewed for its value adding applicability and added to the CAR and Log for follow up. These suggestions may include potential non-conformities.

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Corrective Action Report

Corrective Action involves taking measures to eliminate causes of identified quality problems to ensure the problems do not occur or reoccur.

The following items will be documented and tracked in the Corrective Action Report and Log:

- Best Management Practices
- Corrective Actions
- Preventative Actions

The QMS Representative or designate shall assign the action item to an employee using the Corrective Action Report (CAR) and Log (Form ES 09).

Part A of the Corrective Action Report (CAR) is completed by the Lead Auditor or QMS Representative for non-conformances identified during Internal/External Audits, Management Reviews, Continuous Improvement Suggestions, MECP inspection findings, staff suggestions and preventative actions.

The QMS Representative will issue the CAR number and follow the 5 “Why” Procedure for determining root cause by the following steps:

- 1) Define the Problem
- 2) Ask “why” the problem is occurring
- 3) Continue to ask “why” until it produces no more useful responses
- 4) Record the final answer in the CAR under Root Cause Code

The QMS Representative will then determine who is responsible to address the issue and establish a timeline. The person responsible for the specific issue completes Part B of the CAR and implements the corrective action.

The QMS Representative completes Part C of the CAR within to show that it has been followed up and determine if corrective action has been effectively implemented to prevent reoccurrence.

REFERENCES

Form ES 09 Corrective Action Report (CAR) and Log

Form ES 11 Continual Improvement Opportunities

Table of Revisions

Revision No.	Date (dd/mm/yyyy)	Description of Revision
1	19/02/2020	Updated procedure to include revision table
2	01/03/2021	Corrective Action Report procedure updated
3	26/04/2023	Procedure updated to reflect Internal Document updates (forms/documents to begin with ES, followed by sequential numbering)



Municipality of Strathroy-Caradoc Water Distribution System

DRINKING WATER QUALITY MANAGEMENT SYSTEM APPENDICES

Form ES 01 Document & Records Master List



Form ES 01 Revised: Apr 25/23

DOCUMENT AND RECORDS MASTER LIST

DOCUMENT NAME	DOCUMENT	DOCUMENT LAST REVISED DATE	RECORD	MINIMUM RETENTION TIME	CURRENT STORE LOCATION	ARCHIVED STORE LOCATION	MAINTAINED BY
INTERNAL DOCUMENTS							
Environmental Services (ES) Documents							
DWQMS Operational Plan	X	2025-03-03	X	Permanent record (updated as required)	EPW Network	Electronic	QMS Rep or ES Coordinator
Water Supply, Storage & Distribution System Operations Manual	X	2023-04-27	X	Permanent record (updated as required)	EPW Network	Electronic	QMS Rep or ES Coordinator
Contingency Plan	X	2023-04-26	X	Permanent record (updated as required)	EPW Network	Electronic	QMS Rep or ES Coordinator
Form ES 02 Document Change-Creation Request	X	2023-04-24	X	5 years	EPW Network	Electronic	QMS Rep or ES Coordinator
Form ES 03 Risk Assessment Outcomes	X	2023-04-24	X	5 years	EPW Network	Electronic	QMS Rep or ES Coordinator
Form ES 04 Water Distribution Maintenance Form	X	2023-04-24	X	5 years	EPW Network	Electronic	ES Coordinator
Form ES 05 Customer Complaints	X	2023-12-15	X	5 years	EPW Network	Electronic	ES Coordinator
Form ES 06 Internal Audit Agenda	X	2025-01-28	X	5 years	EPW Network	Electronic	GIS/Asset Analyst
Form ES 07 OPEN FORM TO USE NEXT							
Form ES 08 Internal Audit Report	X	2025-01-28	X	5 years	EPW Network	Electronic	GIS/Asset Analyst
Form ES 09 Corrective Action Records and Log	X	2023-04-24	X	5 years	EPW Network	Electronic	QMS Rep or ES Coordinator
Form ES 10 Top Management Review Agenda/Meeting Minutes	X	2023-04-24	X	5 years	EPW Network	Electronic	ES Manager
Form ES 11 Continual Improvement Opportunities	X	2023-04-24	X	5 years	EPW Network	Electronic	QMS Rep or ES Coordinator
Form ES 12 On the Job Training	X	2023-04-24	X	5 years	EPW Network	Electronic	ES Manager
Form ES 13 New Water/Wastewater Service Inspection	X	2023-04-24	X	5 years	EPW Network	Electronic	ES Manager
Form ES 14 Table Top Exercise	X	2023-04-24	X	5 years	EPW Network	Electronic	ES Manager
Form ES 15 Underground Chamber Maintenance Activities	X	2023-04-24	X	5 years	EPW Network	Electronic	Lead Hand
Form ES 16 Traffic Protection Plan	X	2023-04-24	X	1 year	Environmental Services Office	Office - 61 Albert St, Strathroy	Lead Hand
Form ES 17 Hydrant Flushing Report	X	2023-04-24	X	5 years	EPW Network	Electronic	Lead Hand
Form ES 18 Hydrant Flow Testing	X	2023-04-24	X	5 years	EPW Network	Electronic	ES Coordinator
Form ES 19 Service Connection Application	X	2023-04-24	X	5 years	EPW Network	Electronic	ES Manager
Form ES 20 Fire Hydrant Service Report	X	2023-04-24	X	5 years	EPW Network	Electronic	Lead Hand
Form ES 21 Mount Brydges Reservoir Chlorine Consumption	X	2023-04-24	X	5 years	EPW Network	Electronic	Lead Hand
Form ES 22 Strathroy Reservoir Chlorine Consumption	X	2023-04-24	X	5 years	EPW Network	Electronic	Lead Hand
Form ES 23 Water Service On-Off Request	X	2023-12-15	X	5 years	EPW Network	Electronic	ES Coordinator

Form ES 24 Work Order Rebill	X	2023-04-24	X	5 years	EPW Network	Electronic	Finance Department
Form ES 25 Work Order	X	2023-12-15			EPW Network	NA	ES Coordinator
Form ES 26 Water Meter Removal/Re-Installation Request	X	2023-12-15	X	5 years	EPW Network	Electronic	ES Coordinator
Form ES 27 Generator Inspection Log	X	2023-04-24	X	5 years	EPW Network	Electronic	Lead Hand
Form ES 28 Maintenance Notice	X	Updated as required		Not saved	EPW Network	Electronic	ES Manager
Form ES 29 Environmental Services On-Call Schedule	X	2023-04-24	X	3 years	EPW Network	Electronic	ES Manager
Form ES 30 Water Service Card	X	2023-04-24	X	Permanent record (updated as required)	EPW Network	Electronic	Lead Hand
Form ES 31 Colorimeter Spec Check	X	2024-12-06	X	5 years	EPW Network	Electronic	Lead Hand
Form ES 32 Confined Space Entry	X	2023-04-24	X	5 years	Environmental Service Office	Office -61 Albert St	Lead Hand
Form ES 33 Chlorine Residuals and Analyzer Calibration	X	2024-12-06	X	5 years	EPW Network	Electronic	Lead Hand
Form ES 34 Watermain Inspection Report	X	2023-04-24	X	5 years	EPW Network	Electronic	Lead Hand
Form ES 35 Sewer Maintenance Notice	X	2023-11-23			EPW Network	Electronic	Lead Hand
Water Operational Plan Procedures							
OPro1 Residential Water Specifications	X	2021-01-27	X	Permanent record (updated as required)	EPW Network	Electronic	ES Manager
OPro2 Confined Space Entry	X	2020-10-28	X	Permanent record (updated as required)	EPW Network	Electronic	ES Manager
OPro3 Cleaning Chlorine Analyzers	X	2020-10-28	X	Permanent record (updated as required)	EPW Network	Electronic	ES Manager
OPro4 Cleaning Chlorine Injector	X	2020-10-28	X	Permanent record (updated as required)	EPW Network	Electronic	ES Manager
OPro5 Customer Complaint Procedure	X	2020-10-28	X	Permanent record (updated as required)	EPW Network	Electronic	ES Manager
OPro6 Gate Valves	X	2020-10-28	X	Permanent record (updated as required)	EPW Network	Electronic	ES Manager
OPro7 SCADA Report	X	2020-10-28	X	Permanent record (updated as required)	EPW Network	Electronic	ES Manager
OPro8 Work Orders	X	2020-10-28	X	Permanent record (updated as required)	EPW Network	Electronic	ES Manager
OPro9 Fire Hydrant Service	X	2020-10-28	X	Permanent record (updated as required)	EPW Network	Electronic	ES Manager
OPro10 Fire Hydrant Flushing	X	2020-10-28	X	Permanent record (updated as required)	EPW Network	Electronic	ES Manager
OPro11 Fire Hydrant Maintenance and Operations	X	2020-10-28	X	Permanent record (updated as required)	EPW Network	Electronic	ES Manager
OPro12 Spills Procedure	X	2020-10-28	X	Permanent record (updated as required)	EPW Network	Electronic	ES Manager
OPro13 Water Tower 'Out of Service' Procedure	X	2022-10-24	X	Permanent record (updated as required)	EPW Network	Electronic	ES Manager
EXTERNAL DOCUMENTS							
Packing Slips		N/A	X	5 years	Municipal Office	Office-52 Frank St	Finance Department
Contracts		N/A	X	5 years	EPW Network	Electronic	Legal and Legislative Services Department
Operator Certificates		N/A	X	7 years	EPW Network	Electronic	ES Manager
DWQMS Supplier Communications		N/A	X	3 years	EPW Network	Electronic	ES Manager
DWQMS External Audits		N/A	X	5 years	EPW Network	Electronic	QMS Rep or ES Coordinator
MECP Inspection Reports		N/A	X	5 years	EPW Network	Electronic	ES Manager
Infrastructure Reviews		N/A	X	5 years	EPW Network	Electronic	ES Manager
System Classification Certificates		N/A	X	Permanent record (updated as required)	EPW Network	Electronic	ES Manager

Strathroy and Mount Brydges Alarm Calls by Spectrum		N/A	X	1 Year	EPW Network	ES Managers Email	ES Manager
SCADA Monitoring Results		N/A	X	5 years	EPW Office	Electronic	Lead Hand
Log Books		N/A	X	5 years	Environmental Service Office	Office -61 Albert St	Lead Hand
Chain of Custody		N/A	X	5 years	EPW Network	Electronic	Lead Hand
Bacti Results		N/A	X	5 years	EPW Network	Electronic	Lead Hand
Chemical Sampling		N/A	X	15 years	EPW Network	Electronic	ES Manager
AWQI (Adverse Water Quality Indicator) Corrective Actions		N/A	X	6 years	EPW Network	Electronic	ES Manager
Annual Water Reports		N/A	X	6 years	EPW Network	Electronic	ES Manager
Water Summary Reports		N/A	X	6 years	EPW Network	Electronic	ES Manager
O.Reg 170/03 Community Lead Testing		N/A	X	5 years	EPW Network	Electronic	Lead Hand
Records of Calibration by Certified Contractors		N/A	X	5 years	EPW Network	Electronic	Lead Hand
Council Agenda and Minutes		N/A	X	5 years	EPW Network	Electronic	Legal and Legislative Services Department
Backflow Prevention Device Test Reports		N/A	X	5 years	EPW Network	Electronic	ES Coordinator
Sampling Calendar		N/A	X	1 year	EPW Network	Electronic	Lead Hand

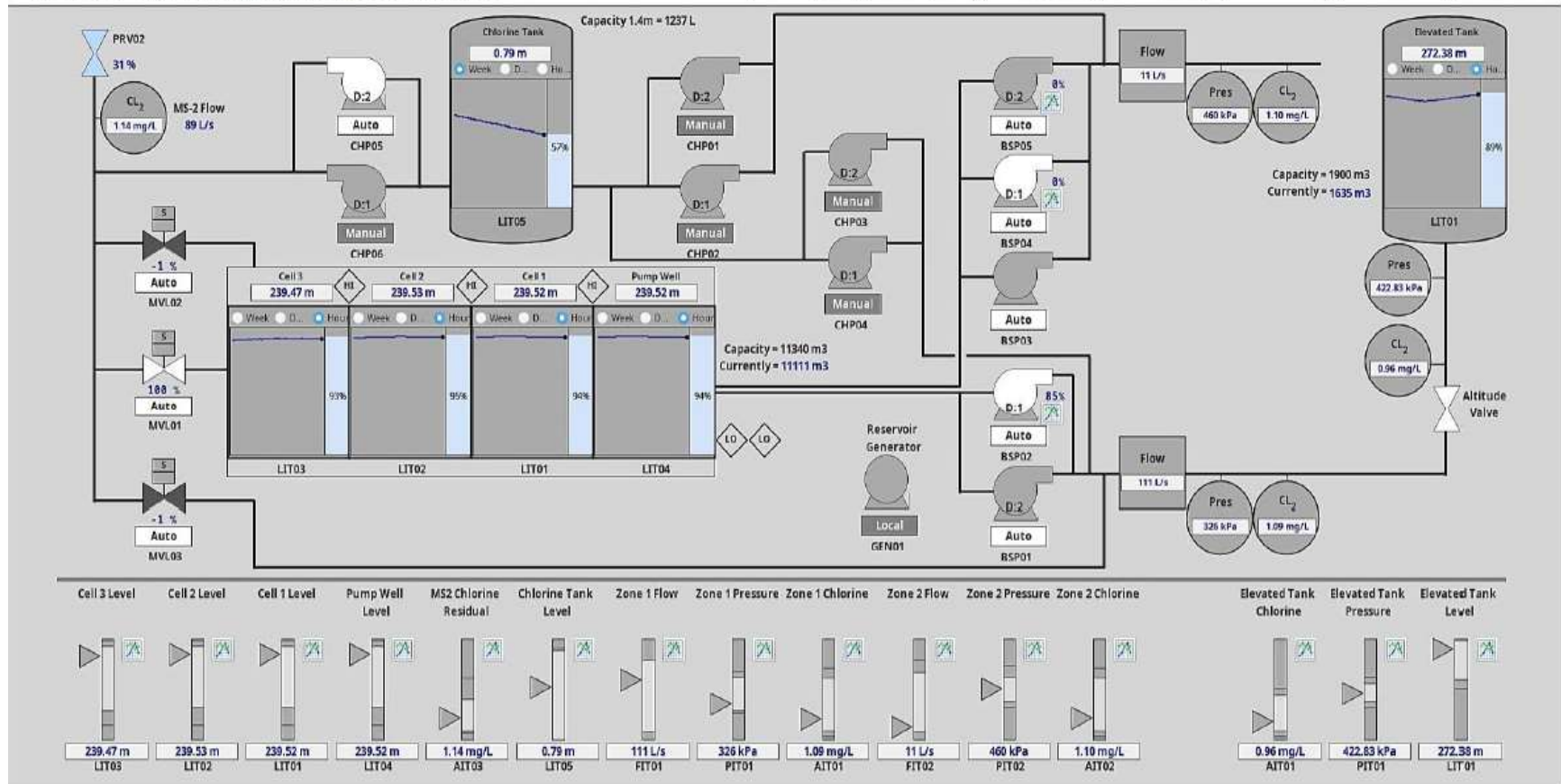
Last Revised March 3, 2025

Strathroy & Mount Brydges Pump Stations Schematic Drawings

Revised: October 28, 2022

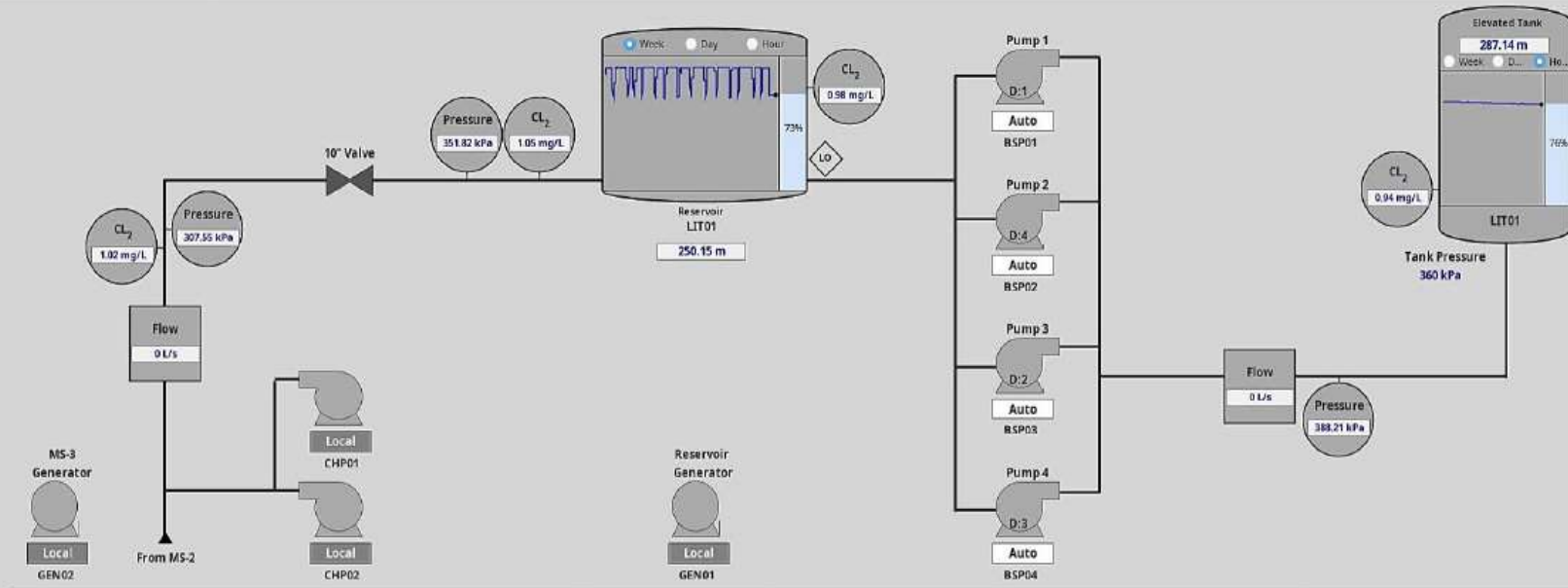
WDSTR - Strathroy Water Distribution

Alarm Setpoints PRV Setpoints BSP Setpoints CHP Setpoints Trends 0 Alarms



WDBRY - Mt Brydges Water Distribution

Alarm Setpoints Setpoints Trends 0 Alarms



MS-3 Chlorine	MS-3 Pressure	MS-3 Flow	Reservoir Inlet Chlorine	Reservoir Inlet Pressure	Reservoir Level	Reservoir Chlorine	Reservoir Discharge Flow	Reservoir Discharge Pressure	Elevated Tank Level	Elevated Tank Chlorine
1.02 mg/L AIT01	307.55 kPa PIT01	0 L/s FIT01	1.05 mg/L AIT02	351.82 kPa PIT02	250.15 m LIT01	0.98 mg/L AIT01	0 L/s FIT01	368.21 kPa PIT01	287.14 m LIT01	0.94 mg/L AIT01