The Corporation of the Town of Essex

OPERATIONAL PLAN

For the

Essex Water Distribution System

Revision 21, April 10th 2026

DISCLAIMER STATEMENT

This Operational Plan is designed for the exclusive use of The Town of Essex.

This Operational Plan has been developed with OCWA's assistance.

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Operational Plan Revision History:

Revision #	*Date*	*Description of Revision*
0	January 23, 2009	Original Document
1	September 17, 2012	Document reviewed
2	May 14, 2013	Implemented action items identified from the Internal Audit Report issued May 1, 2013
3	August 6, 2013	Updated Infrastructure Maintenance, Rehabilitation and Renewal procedure in Element 15 which was identified from the non-conformance issued in the External Audit Report.
4	April 22, 2014	Implemented recommendations from the external and internal audit report.
5	April 21, 2015	Raw Water Characteristic Tables were updated with 2014 data and the Town of Essex Infrastructure Projects table was updated.
6	June 17, 2016	Raw Water Characteristic Tables were updated with 2015 data and the Town of Essex Infrastructure Projects table was updated.
7	July 11, 2016	Updated the CAO on Element 3 – Commitment and Endorsement
8	June 15, 2017	Raw Water Characteristic Tables were updated with 2016 data and the Town of Essex Infrastructure Projects table was updated.
9	July 5, 2018	Updated the CAO on Element 3 – Commitment and Endorsement; Raw Water Characteristic Tables were updated with 2017 data; and the Town of Essex Infrastructure Projects table was updated.
10	February 14, 2019	Implement changes as per the new standard (DWQMS Version 2.0)
11	August 06, 2019	Removed names and updated with Internal Audit. Changed Essex Water Department to Essex Environmental Services.
12	July 30, 2020	Updated with Internal Audit changes and Management Review. Added Director of Infrastructure Services to the Commitment and Endorsement.
13	July 21, 2021	Raw Water Characteristic Tables were updated with 2020 data
14	November 30,2021	Updated with new staff.
15	April 07, 2022	Raw Water Characteristic Tables were updated with 2021 data
16	October 22, 2022	All Activities/Process Steps were re-assessed, and some consequences and likelihoods were modified.
17	July 7th 2023	Updated with Internal Audit recommendations.
18	September 5th 2023	Updated Table 1 “Risk Assessment”
19	May 21st 2024	Updated Raw Water Characteristic Tables
20	April 7th 2025	Updated Raw Water Characteristic Tables
21	April 10th 2026	Updated Raw Water Characteristic Tables + Endorsement

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Appendix Index

1. The Corporation of the Town of Essex Environmental Services' Quality Management System (QMS)

The Corporation of the Town of Essex, hereafter referred to as the Town of Essex, is the Owner of the Essex Water Distribution System (WDS). The Town of Essex is also the Operating Authority of the Essex Water Distribution System, which is operated by its water services department referred to hereafter as Essex Environmental Services.

This document is the drinking water Quality Management System (QMS) Operational Plan for Essex Environmental Services and is structured and documented with the purpose of:

1. Establishing policy and objectives with respect to the effective management and operation of the water distribution system.
2. Understanding and controlling the risks associated with the distribution system's activities and processes.
3. Achieving continuous improvement of the QMS and the distribution system's performance.

The Operational Plan for the above noted facility listed above fulfils the requirements of the MOECC's DWQMS. The 21 QMS Procedures within this Operational Plan align with the 21 elements of the DWQMS.

2. Quality Management System (QMS) Policy

Essex Environmental Services, its Management and entire staff are committed to the principles and objectives set out in our Quality Management System (QMS) Policy. The Town of Essex is committed to providing safe drinking water to its drinking water system customers.

This commitment shall be fulfilled by Essex Environmental Service's adherence to the following:

- Operate and maintain the drinking water supply system in accordance with all applicable legislation and regulation
- Ensure that all staff are well trained, competent to undertake the duties assigned them and certified appropriately
- Provide its customers with safe drinking water
- Maintain and continuously improve its Quality Management System

Our water system operational employees will be trained in the implementation of the QMS Policy. The QMS Policy will be given to Municipal Council and made available to the public on the municipal website and upon request.

This Policy was approved by Essex Municipal Council on Monday, February 2, 2009

3. Commitment and Endorsement of Essex Environmental Service's QMS and Operational Plan

This Operational Plan supports the overall goal of Essex Environmental Services and The Town of Essex to develop, implement and continuously improve its Quality Management System for the Essex Water Distribution System.

Top management of both Essex Environmental Services and The Town of Essex has approved the QMS for the drinking water system as documented in this Operational Plan.

Operating Authority Approval

_____ _____
Kevin Girard, P. Eng. Date
Director of Infrastructure Services
Town of Essex

_____ _____
Rob Mackie, C.E.T. Date
Manager, Environmental Services
Town of Essex

Owner Endorsement and Approval

_____ _____
Kate Giurissevich, CPA, CA Date
Chief Administrative Officer
Town of Essex

4. Quality Management System Representative

All personnel have a role and associated responsibilities within Essex Environmental Service's QMS.

The role of the QMS Representative for the Essex Water Distribution System is shared between the Director, Infrastructure Services and the Manager, Environmental Services.

The Director, Infrastructure Services is responsible for:

- establishing and maintaining processes and procedures required for the overall administration of the facility's QMS
- Reporting to the owner and owner's representative on QMS performance and identified improvements.
- monitoring QMS performance and identifying opportunities for improvement

The Manager, Environmental Services is responsible for:

- ensuring that current versions of documents are in use
- ensuring personnel are aware of all applicable legislation and regulatory requirements that pertain to their operational duties
- activities related to the operation of the drinking water system

The Director, Infrastructure Services, Environmental Services are responsible for promoting awareness of the QMS to all facility personnel.

5. Document and Records Control

All documents and records required by this Quality Management System to demonstrate compliance with Essex Environmental Services' QMS Policy are maintained in accordance with Essex Environmental Services' in the **Appendix, Procedure 5:01, Tab A**.

All documents and records required by this Quality Management System are:

i. kept current, legible, and readily identifiable
ii. retrievable
iii. stored, protected, retained and disposed of

6. Drinking Water System

6.1 General

The Town of Essex owns and operates the Essex Water Distribution System (WDS). The Essex WDS supplies water to residents, institutions and businesses in the municipality.

6.2 System Overview

The Essex WDS is a stand-alone water distribution system which has two operational subsystems. These are named the Essex (Union) WDS and the Essex (Harrow-Colchester South) WDS.

Essex (Union) WDS: The Essex (Union) WDS gets water from the Union Water Supply System (UWSS). It is a water distribution system that does not have any storage, pumping or disinfectant boosting facilities in it. More details of the UWSS are provided in Section 6.3 below.

Essex (Harrow-Colchester South) WDS: The Essex (Harrow-Colchester South) WDS gets water from the Harrow-Colchester South WTP, operated by OCWA. It is a water distribution system that does not have any storage, pumping or disinfectant boosting facilities in it. More details of the Harrow-Colchester South WTP are provided in Section 6.3 below.

Emergency water interconnects exist and are kept closed except in emergency situations, as identified in Element 18:01.

The Essex WDS is connected to three other water systems, the Union Water Supply System, the Town of Amherstburg and the Town of Lakeshore.

6.3 Water Source

The Essex WDS has two treated water sources.

<u>Union Water Supply System</u>

The UWSS is a drinking water system owned by the municipalities of Essex, Kingsville, Lakeshore and Leamington and is managed on behalf of the owners by a Joint Board of Management and operated by the Ontario Clean Water Agency (OCWA). The raw water is obtained from Lake Erie and is treated by a conventional surface water treatment plant.

Raw Water Characteristics at the Intake (based on 2025 data)

2025	Characteristic	Minimum	Maximum	Annual Average
	Temperature (ºC)	**0.90**	**27.05**	**12.53**
	Turbidity (NTU)	**1.24**	**166**	**14.3**
	pH	**6.97**	**8.09**	**7.34**
	***E. coli* (CFU/100 mL)**	**10**	**100**	**29.63**
	Total Coliforms	**10**	**2280**	**141.00**

Essex (Harrow-Colchester South) Water System

The Harrow-Colchester South Water System (HCSWS) is a drinking water system owned by the Town of Essex and operated by the Ontario Clean Water Agency (OCWA). The raw water is obtained from Lake Erie and is treated by a conventional surface water treatment plant.

Raw Water characteristics at the Intake (based on 2025 data)

2025	Characteristic	Minimum	Maximum	Annual Average
	Temperature (ºC)	**1.0**	**25.13**	**12.42**
	Turbidity (NTU)	**3.09**	**99.0**	**18.83**
	pH	**8.04**	**8.65**	**8.28**
	***E. coli* (CFU/100 mL)**	**10**	**100**	**66.15**
	Total Coliforms	**10**	**4100.0**	**311.92**

There are no common event-driven fluctuations or threats outside of vandalism in the distribution system.

6.4 Critical Control Processes

6.4.1 Upstream

Essex (Union) WDS:

OCWA controls the treatment of the raw water, the pressure in the system and the secondary disinfection of the treated water. Critical processes are treatment of the raw water to ensure that the final treated water is safe, maintaining the pressure at an adequate level and ensuring that the secondary disinfectant residual leaving the WTP is sufficient to maintain a proper residual at all points in the distribution system.

Essex (Harrow-Colchester South) WDS:

OCWA controls the treatment of the raw water, the pressure in the system and the secondary disinfection of the treated

water. Critical processes are treatment of the raw water to ensure that the final treated water is safe, maintaining the pressure at an adequate level and ensuring that the secondary disinfectant residual leaving the WTP is sufficient to maintain a proper residual at all points in the distribution system.

6.4.2 Downstream

The Town of Essex has a municipal backflow prevention by-law to ensure that backflow preventers are installed, maintained and operated at all business premises connected to the water distribution system where a threat from backflow exists.

6.5 Connections to Other Systems

There are five (5) interconnections between each operational subsystem of the Essex WDS and other water systems.

1. The Essex (Union) WDS and the Essex (Harrow-Colchester South) are connected at 3 locations. These connections are at valves(s) which are ordinarily kept closed. The valves will only be opened in the event of an emergency.

2. The Essex (Union) WDS is connected to the UWSS. The Essex (Union) WDS is supplied with water from the UWSS at the connection points.

3. The Essex (Union) WDS is connected to the Town of Lakeshore (Union) WDS. This connection is at a valve which is ordinarily kept closed. This valve will only be opened in an emergency.

4. The Essex (Union) WDS is connected to the Amherstburg WDS. The connection points are at closed valves. These valves will only be opened in an emergency.

5. The Essex (Harrow-Colchester South) WDS is connected to the Union and Amherstburg WDS. The connection point is at a closed valve. This valve will only be opened in an emergency.

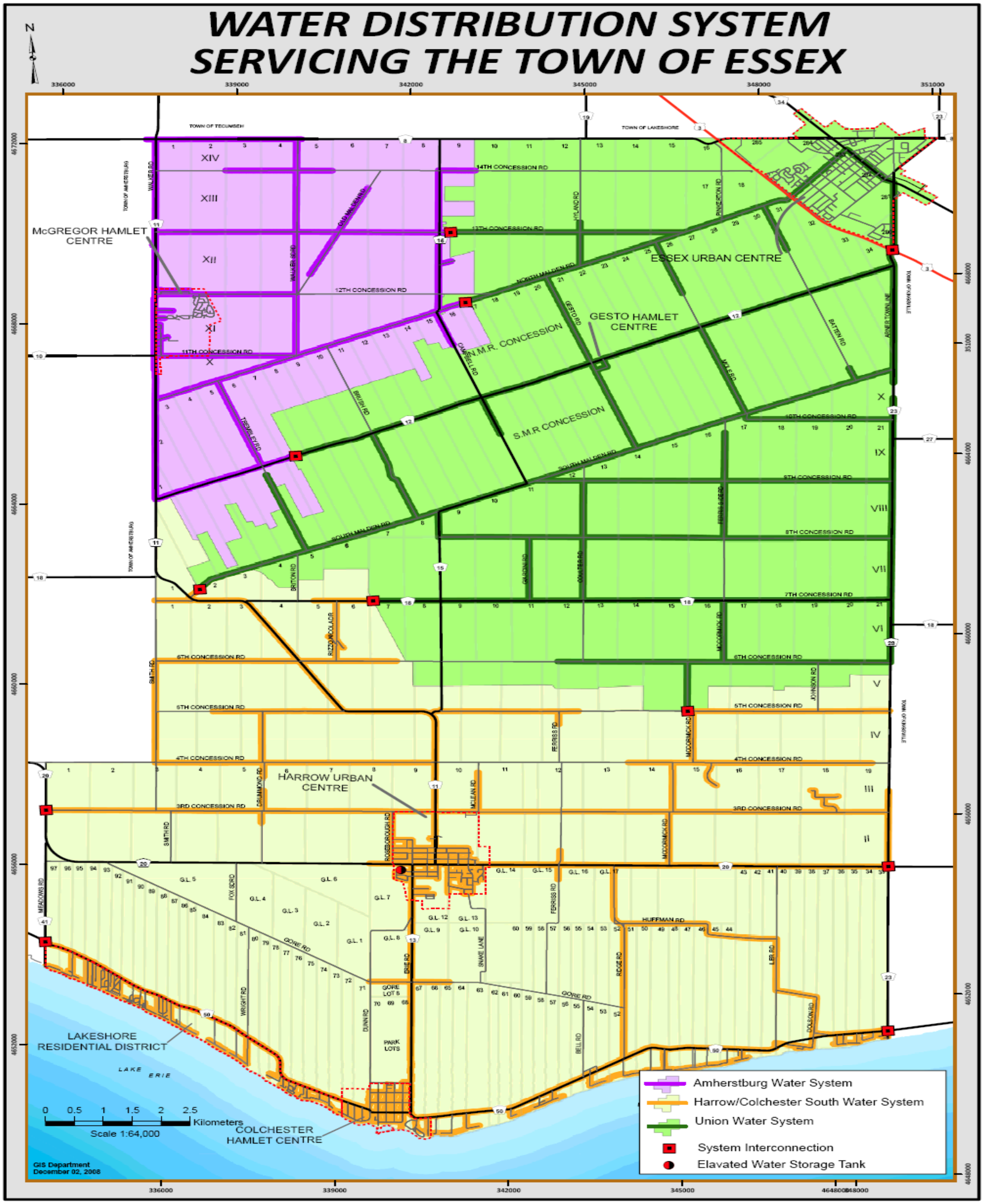
6.6 Water Distribution System Components

Essex (Union) WDS: This water distribution system is comprised of 150 kms of watermains from 100mm (4 inch) diameter to 300mm (12 inch) diameter. There are approximately 350 fire hydrants in the system. There are approximately 3300 residential service connections and approximately 375 commercial connections.

Essex (Harrow-Colchester South) WDS: This water distribution system is comprised of 145 kms of watermains from 50mm (2 inch) to 350mm (16inch) in diameter. There are approximately 375 fire hydrants in the

system. There are approximately 3500 residential and approximately 150 commercial service connections.

This Town of Essex Distribution System is outlined on the 'Water Distribution System Servicing the Town of Essex' map shown below.


WATER DISTRIBUTION SYSTEM
SERVICING THE TOWN OF ESSEX
McGREGOR HAMLET CENTRE
ESSEX URBAN CENTRE
GESTO HAMLET CENTRE
N.M.R. CONCESSION
S.M.R CONCESSION
HARROW URBAN CENTRE
LAKESHORE RESIDENTIAL DISTRICT
COLCHESTER HAMLET CENTRE
LAKE ERIE
0 0.5 1 1.5 2 2.5 Kilometers
Scale 1:64,000
GIS Department
December 02, 2008
Amherstburg Water System
Harrow/Colchester South Water System
Union Water System
System Interconnection
Elavated Water Storage Tank

7. Risk Assessment

Refer to **Appendix, Tab B Procedure 7/8:01** Risk Assessment and Risk Assessment Outcomes.

8. Risk Assessment Outcomes

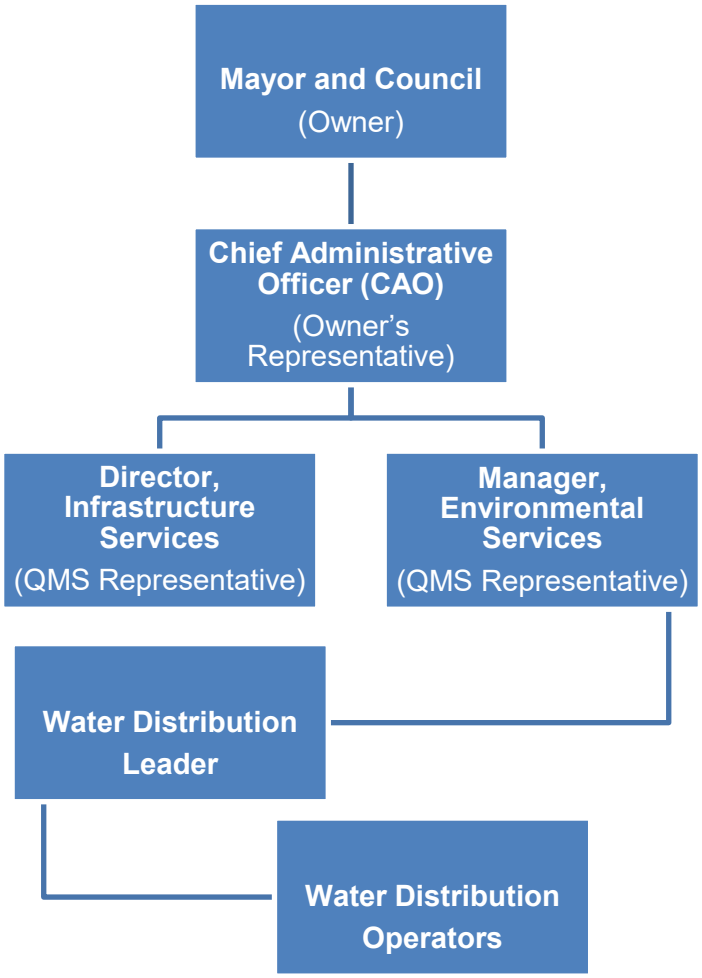
Refer to **Appendix, Tab B, Procedure 7/8:01**, for Summary of Risk Assessment Outcomes

9. Organizational Structure, Roles, Responsibilities, and Authorities

The Director, Infrastructure Services (QMS Representative) will keep the organizational structure, roles, responsibilities and authorities current and will communicate this information to the Operating Authority's personnel and the Owner. The Director, Infrastructure Services and Manager, Environmental Services (QMS Representatives) are the Top Management for Essex Environmental Services. The Owner of this system is The Corporation of the Town of Essex.

The following flow chart represents the Organizational Structure for the Town of Essex.

Organizational Chart



The following table lists the Position Titles, the responsibilities of each position, and their respective authorities.

Roles, Responsibilities and Authorities Table

TITLE	RESPONSIBILITIES	AUTHORITIES
Mayor and Council, through the CAO	▪ Complete oversight of the entire distribution system and the QMS ▪ Ultimate responsibility for the provision of safe drinking water ▪ Ensure compliance with applicable legislation and regulations	▪ Financial and administrative authority related to the distribution of safe drinking water
Director, Infrastructure Services(QMS Rep)	▪ Complete oversight of the entire distribution system ▪ Responsibilities of QMS rep as outlined in Element 4 ▪ Provide and/or obtain resources for the QMS and necessary infrastructure and resources to operate and maintain the drinking water system safely and efficiently ▪ Ensure the system is operated in accordance with applicable legislation and regulations ▪ Participate in the Management Reviews ▪ Communication with Mayor, Council and CAO about the QMS and the water distribution system ▪ Preparation of budget and planning materials	▪ Financial, administrative and technical authority related to the distribution of safe drinking water ▪ Staffing within the guidelines of the municipality and its collective agreement ▪ Oversee adverse water quality incidents and responses ▪ Make changes to the QMS ▪ Attend council meetings as required ▪ Ensures Management Review minutes are provided to owner
Manager, Environmental Services (QMS Rep)	▪ The operation of the entire distribution system ▪ Responsibilities of QMS rep as outlined in Element 4 ▪ Schedule and oversee the day-to-day activities relating to the water distribution system ▪ Communication/liaison with the Director, Infrastructure and Development ▪ Works with Director, Infrastructure Services on annual assessments of operator personnel performance ▪ Lead and participate in the Management Reviews ▪ Recommendation of system improvements ▪ Develop procedures and processes for assuring water quality ▪ Emergency response planning and training ▪ Schedule and oversee the day-to-day activities relating to the water distribution system ▪ Assists in the development of procedures and processes for assuring water quality ▪ ORO Responsibility	▪ Make changes to the QMS ▪ Oversee adverse water quality incidents and responses ▪ Orders day-to-day supplies and equipment as needed ▪ Attend council meetings as required ▪ Direct operators in day to day operation and maintenance of the water distribution system. ▪ Program scheduling within Essex Environmental Services ▪ Identify and oversee staff training needs ▪ Delegate ORO to certified operators in absence ▪ Documents completion of action plans from Management Review

Water Distribution Leader	▪ Distribution of Work orders ▪ Assigning/Coordinating of work crews ▪ Performing construction, repair, installation and maintenance activities ▪ Order and maintain sufficient levels of sock ▪ Assists in training of staff ▪ Report aby incidents of non-compliance	▪ Maintenance of the water distribution system ▪ Respond to public complaints as relayed from the Director, Infrastructure Services or the Manager, Environmental Services
Water Distribution Operators	▪ Regular maintenance of the water distribution system ▪ Report any incidents of non-compliance ▪ Respond to repair directed from Director, Public Works or the Manager, Environmental Services	▪ Maintenance of the water distribution system ▪ Respond to public complaints as relayed from the Director, Infrastructure Services or the Manager, Environmental Services or Water Distribution Leader

10. Competencies

The following table illustrates the competencies required by personnel whose duties directly affect drinking water quality.

COMPETENCY REQUIREMENTS TABLE

POSITION	REQUIRED COMPETENCIES
Director, Infrastructure and Development	• Ability to effectively manage staff at all levels and ensure accountability for performance and results • Thorough knowledge of the engineering and public works principles and practices • Extensive knowledge of the principles and practices of managing complex capital work projects • Knowledge of the current water and sanitary services regulatory environment • Working knowledge of the principles and practices of office management, work organization and supervision • Knowledge and awareness of the DWQMS • Ability to plan, organize, coordinate and implement a comprehensive infrastructure services system • Well-developed priority-setting and time management skills • Superior interpersonal skills • Excellent oral and written communication skills • Proficiency in office and operational computerized systems
Manager, Environmental Services	• Operator certification in good standing; required to act as ORO • Comprehensive general knowledge of and experience in managing water and wastewater treatment, operations, maintenance and administration • Ability to effectively manage staff at all levels and ensure staff performance • Possess public relations and interpersonal skills to clarify facts, give information and respond to complaints • Knowledge of procurement policies and procedures to oversee all stages of acquisitions of goods and services and prepare Request of Quotations and Request for Proposals • Ability to plan, organize, coordinate and implement a comprehensive infrastructure services system • Knowledge and awareness of the DWQMS • Well-developed priority-setting and time management skills • Superior interpersonal skills • Excellent oral and written communication skills • Proficiency in office and operational computerized systems • Valid Class G Driver's
Water Distribution Leader	• Operator certification in good standing; minimum Class II

	• Ability to locate, install and repair water mains, services, valves, hydrants, valve boxes, water meters and curb stops • Install, locate and repair domestic, fire, commercial and industrial services and associated equipment • Perform general labour including digging and installation of shoring, as directed • Familiarity with various tools and equipment including compressor, tamper, cement saw, pumps, shovels, pipe cutters, tapping machines, boring machines, wrenches, etc • Ability to conduct pressure testing, flushing, chlorinating, cleaning and maintenance of mains and valves • Knowledge and awareness of the DWQMS • Good oral and written communication skills. • Ability to work in a team and take initiative when required. • Valid Class G and DZ Driver's License.
Water Distribution Operator	• Operator certification in good standing; minimum OIT • Ability to locate, install and repair water mains, services, valves, hydrants, valve boxes, water meters and curb stops • Install, locate and repair domestic, fire, commercial and industrial services and associated equipment • Perform general labour including digging and installation of shoring, as directed • Familiarity with various tools and equipment including compressor, tamper, cement saw, pumps, shovels, pipe cutters, tapping machines, boring machines, wrenches, etc • Ability to conduct pressure testing, flushing, chlorinating, cleaning and maintenance of mains and valves • Knowledge and awareness of the DWQMS • Good oral and written communication skills. • Ability to work in a team and take initiative when required. • Valid Class G and DZ Driver's License.

The competency requirements listed in the Competency Requirements Table are addressed by various means including:

- All employees listed have provided evidence of certification and other "required" competencies. All MOE required certificates or copies are posted at the Essex Environmental Services office.
- Changes to the Distribution System and/or to the QMS are communicated, as needed, to all Essex Environmental Services Staff by the Manager, Environmental Services.
- All records of training are maintained at the Essex Environmental Services office as proof that the required training has been successfully completed. The Manager, Environmental Services is responsible for monitoring the completion of all identified training.

11. Personnel Coverage

Refer to **Appendix, Tab C, Procedure 11:01**, for Personnel Coverage.

12. Communications

Refer to **Appendix, Tab D, Procedure 12:01** Communications

13. Essential Supplies and Services

Refer to **Appendix, Tab E, Procedure 13:01** Essential Supplies and Services

14. Review and Provision of Infrastructure

Refer to **Appendix, Tab F, Procedure 14:01** Review and Provision of Infrastructure

15. Infrastructure Maintenance, Rehabilitation and Renewal

This Element summarizes the maintenance, rehabilitation and renewal programs that are in place for the infrastructure of the Essex Environmental Services.

15.1 Planned Infrastructure Maintenance

The Director, Infrastructure Services along with the Manager, Environmental Services in consultation with the water distribution staff recommends maintenance activities for the annual budget. The Manager, Environmental Services then plans the maintenance activities based on the approved annual budget. The planned maintenance activities are then communicated to the water distribution staff through routine meetings.

Maintenance plans are developed according to the manufacturer's instructions, regulatory requirements and industry standards. Equipment Operation and Maintenance (O&M) manuals are accessible to staff at the locations specified in QMS Procedure 5:01 Document and Records Control.

Planned maintenance activities are documented and recorded on time sheets and maintenance records.

Notice of activities that might affect customers, may be posted in the local media, posted on the Town of Essex website or customers may be notified directly.

Planned maintenance activities are reviewed to detect trends.

15.2 Unplanned Infrastructure Maintenance

Unplanned maintenance activities are responded to on an as needed or emergency basis. All unplanned maintenance activities are authorized by the Manager, Environmental Services.

Unplanned maintenance activities are documented and recorded on time sheets and maintenance records. These activities are then reviewed annually for trends through a review of the Essex Environmental Service's annual statistics.

15.3 Infrastructure Rehabilitation and Renewal

Rehabilitation and renewal activities including capital upgrades and/or recommendations are determined at least once every calendar year (refer to QMS Procedure 14:01 Review and Provision of Infrastructure). A list of required replacement or desired new equipment is compiled and prioritized by the Manager, Environmental Services in consultation with the Director, Infrastructure Services who then authorizes the planned rehabilitation and renewal activities. All major expenditures require the approval of the Owner. In addition to the short-term facility needs (i.e. current year), the list also provides a long-tern (i.e. rolling six-year) list of major maintenance recommendations.

Planning with other departments, projected growths and the results of unplanned maintenance trends are also considered when planning rehabilitation activities.

The infrastructure needs and approved plans are communicated through management and staff meetings.

15.4 Program Monitoring

To assist in monitoring the effectiveness of the program, the Manager, Environmental Services and Director, Infrastructure Services meet regularly to determine the status of the capital upgrades and/or recommendations, planned maintenance and unplanned maintenance activities.

Maintenance plans are developed for the distribution system according to a combination of the manufacturer's instructions, regulatory requirements, industry standards and equipment operating history. Equipment Operation and Maintenance (O&M) manuals are accessible to staff at the locations specified in QMS Procedure 5:01 Document and Records Control.

Maintenance activities are also reviewed annually for trends through a review of the Essex Environmental Service's annual statistics.

The Town of Essex's infrastructure maintenance, rehabilitation and renewal program if initially communicated to the Owner through council meetings. The Town's program is also communicated to the Owner at a minimum of at least once every calendar year through the submission of the capital upgrades recommendations report and through the results of the Management Review.

16. Sampling, Testing, and Monitoring

Refer to **Appendix, Tab G, Procedure 16:01** Sampling, Testing and Monitoring

17. Measurement and Recording Equipment Calibration and Maintenance

Refer to **Appendix, Tab H, Procedure 17:01** Measurement and Recording Equipment Calibration and Maintenance

18. Emergency Management

Refer to **Appendix, Tab I, Procedure 18:01** Emergency Management

19. Internal Audits

Refer to **Appendix, Tab J, Procedure 19:01** Internal Audit

20. Management Review

Refer to **Appendix, Tab K, Procedure 20:01** Management Review.

21. Continual Improvement

The Town of Essex strives to continually improve the effectiveness of its QMS for this distribution system through the identification and implementation of corrective/preventive actions and, as appropriate, through review and consideration of applicable Best Management Practices (BMPs).

1. Corrective Actions

    a. Non-conformances may be identified through an internal and/or external QMS audit(s) conducted for this drinking water system. They may also be identified as a result of other events such as:

        - an incident/emergency;
        - customer complaint; or
        - other review.

    b. The QMS Representative(s) investigates the need for a corrective action to eliminate the root cause(s) so as to prevent the non-conformance from recurring. The investigation may also include input from the operators and other stakeholders and the consideration of BMPs as appropriate.

    c. The QMS Representative(s) determines the corrective action needed based on this consultation and then assigns responsibility and a target date for resolution.

    d. The QMS Representative(s) ensures corrective actions are documented using the Essex Distribution System NC-OFI Tracking form. The QMS Representative(s) monitors the progress of corrective action(s) and provides status updates to Top Management.

    e. The implementation and effectiveness of corrective actions are verified during subsequent internal QMS audits and are considered during the Management Review. If there is evidence that the action taken was not effective, the QMS Representative(s) initiates further corrective action and assigns resources as appropriate until the non-conformance is fully resolved.

2. Preventive Actions

    a. Potential preventive actions may be identified through an internal and/or external QMS audit as Opportunities For Improvement (OFIs), during the Management Review or through other means such as:

        - staff/Owner suggestions;
        - regulator observations;
        - evaluation of incidents/emergency response/tests; and
        - a result of considering a BMP.

b. The QEMS Representative(s) considers whether a preventive action is necessary. The review may also include input from the operators and other stakeholders and the consideration of BMPs as appropriate.

c. If it is decided that a preventive action is necessary, the QMS Representative(s) determines the action to be taken and assigns responsibility and a target date for implementation.

d. The implementation of preventive actions is tracked by the QMS Representative(s) using the Essex Distribution System NC-OFI Tracking form.

e. The implementation and effectiveness of preventive actions are verified during subsequent internal QMS audits and are considered during the Management Review. If there is evidence that the action taken was not effective, the Operations Management (or designate) may consider further preventive actions and assigns resources as appropriate.

f. The QMS Representative(s) monitor corrective/preventive actions on an ongoing basis and review the status and effectiveness of the actions during subsequent Management Review meetings.

3. Best Management Practices (BMPs)

a. The QMS Representative(s) will review and consider applicable internal and/or external BMPs identified by internal and/or external sources as part of the Management Review (OP-20) and in the corrective and preventive action processes described above.

b. BMPs may include, but are not limited to:
   - Facility developed and adopted as a result of changes to legislative or regulatory requirements, trends from audit findings or drinking water system performance trends;
   - Drinking water industry based standards/BMPs or recommendations; or
   - Those published by the Ministry of the Environment and Climate Change.

c. At a minimum, applicable BMPs must be reviewed and considered once every 36 months.

Essex Water Distribution System

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Appendix

Appendix Index

DOCUMENTS and RECORDS CONTROL

1.0 Purpose

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

2.0 Scope

This procedure is applicable to Essex Environmental Services employees who manage or perform work related to the Essex Water Distribution System operations. This procedure covers all QMS Documents and Records identified in Table 2.

3.0 Responsibilities

3.1. All employees of the Essex Environmental Services are:

- Responsible for complying with this procedure.
- Responsible for requesting changes to QMS documents.

3.2. QMS Representative(s) are:

- Responsible for activities related to updating Documents.
- Responsible for ensuring that the requirements of this procedure are met for storage, protection, retrieval, retention time and disposition of documents and records.
- Ensure independent review, the QMS representative reviewing a document will be a separate individual than the QMS representative approving that document.
- Responsible for reviewing this procedure, and the Documents and Records related to this procedure, on an annual basis, to ensure they are current and relevant.

4.0 Definitions

Document – includes a sound recording, video tape, film, photograph, chart, graph, map, plan, survey, book of account, and information recorded or stored by means of any device

Record – a document stating results achieved or providing proof of activities performed

QMS Document – any document required by the QMS as identified in this procedure

QMS Record – any record required by the QMS as identified in this procedure

Controlled – managed as per the conditions of this procedure

Retention Period – length of time that a document or record must be kept; see Table 2.

5.0 Procedure

5.1 Documents and Records

- Documents are either internal QMS documents or external QMS documents.
- Documents and Records required by the QMS are listed in Table 1.

5.2 Currency and Legibility

- QMS records are filed at the Essex Environmental Service's office, 120 Sinasac St. West, Harrow.
- QMS records are stored in such a manner as to prevent deterioration.
- Records older than the age noted in Table 2 are shredded.
- Documents are edited in a timely manner, as changes occur, by the QMS representative responsible.
- The QMS Representative(s) reviews all QMS documents on an annual basis, to ensure that the information is still correct and current.
- All manual documents and records shall be clearly visible and legible. Pencil or any other erasable marker shall not be used to record information or data.

5.3 Identification

- External Documents are identified by date stamping and filing the document. Table 1 is then updated to reflect the addition of the new document.
- Internal Documents and Records are prepared in a consistent format, similar to this Procedure in format, and are all numbered to assist in managing, locating and retrieving them.

5.4 Storage and Retrieval

- The QMS Document and Record Control Centre is located at the Essex Environmental Services office and control is the responsibility of the assigned QMS Representative(s).
- All the originals of all active paper records, electronic records and archived documents are stored at the Essex Environmental Services office.
- All internal QMS documents are electronically controlled, with only the designated QMS Representative(s) having electronic access to modify them.

5.5 Protection

- Active paper documents and records are stored in file cabinets, and are thus protected from damage, deterioration and loss.
- Electronic records are stored in a "read-only" manner on a file server remote from Essex Environmental Services offices and are backed up.
- Archived documents and records are stored in the Manager, Environmental Services office.

5.6 Retention

- Records will be maintained for the length of time indicated in Table 2.

5.7 Disposal

- Disposal of obsolete documents and records is the responsibility of the assigned QMS Representative.
- Records older than the age noted in table 2 are shredded.

6.0 Related Documents and Records

A list of associated Forms, Procedures, Work Instructions, Documents and other Records, is attached to this Procedure as Table 1.

7.0 Revision History

Date	Revision #	Reason for Revision
23-Jan-09	0	Procedure issued
17-Sept-12	1	Document Review
14-May-13	2	Implement actions identified from the internal audit
22-Apr-14	3	Reviewed procedure and adjusted header

Table 1: Designated location for documents and records required by the Operating Authority's QMS

Type of Document	Designated Document Control Location (HC = Hardcopy, E = Electronic)
Internal QMS Documents	
Standard Operating Procedures related to QMS	HC - Essex Environmental Services Office
Essential Supplies and Services Contact List	HC - Essex Environmental Services Office
Operational Plan and Procedures	HC and E - Essex Environmental Services Office
System Map	HC and E - Essex Environmental Services Office
Contracts with – UWSS and OCWA	HC - Essex Environmental Services Office
Job Descriptions	HC - Essex Environmental Services Office
External QMS Records	
Applicable Acts and Regulations	HC and E - Essex Environmental Services Office
Equipment manuals	HC and E - Essex Environmental Services Office
AWWA and other Standards	HC - Essex Environmental Services Office
Applicable Municipal By-Laws	HC and E - Essex Environmental Services Office
Collective Agreement	HC - Essex Environmental Services Office
Town of Essex – Procurement Policy	HC - Essex Environmental Services Office
Municipal Emergency Response Plan	HC - Essex Environmental Services Office
QMS Records	
Completed Work Orders	HC - Essex Environmental Services Office
Customer Complaints	HC - Essex Environmental Services Office
Chlorine Residuals (In house)	HC - Essex Environmental Services Office
Communications Related to QMS, Internal – External	HC - Essex Environmental Services Office
Calibrations Certificates	HC - Essex Environmental Services Office
Management Review Documents	HC - Essex Environmental Services Office
Adverse Water Quality Incident Reports	HC - Essex Environmental Services Office
Annual Budgets	HC - Essex Environmental Services Office
Training Records	HC - Essex Environmental Services Office
Flushing Records	HC - Essex Environmental Services Office
External/Internal Audit Reports, Action Plans and Checklists	HC - Essex Environmental Services Office

Table 2: Relevant regulatory and minimum retention periods

Type of Document/Record	Minimum Retention Time	Requirement Reference
DWQMS Operational Plan	10 years	Director's Direction under SDWA
Internal QEMS Audit Results	10 years	Town of Essex Requirement
External QEMS Audit Results	10 years	Town of Essex Requirement
Management Review Documentation	10 years	Town of Essex Requirement
Documents/records required to demonstrate conformance with the DWQMS	3 years	Town of Essex Requirement
Documents/records required to demonstrate compliance with Ontario legislation	As per applicable regulations	SDWA O. Reg. 170/03, O. Reg. 128/04

	Essex Environmental Services Procedure 7/8:01 Risk Assessment and Outcomes	Procedure: 7/8:01 Issued: 14-Feb-19 Rev.#: 5 Page:1 of 9
Reviewed by: Essex Environmental Services Director, Infrastructure Services Manager, Environmental Services		***Approved by***: Essex Environmental Services Director, Infrastructure Services Manager, Environmental Services

RISK ASSESSMENT and RISK ASSESSMENT OUTCOMES

1.0 Purpose

To define the process for conducting a drinking water risk assessment and for documenting and reviewing the results.

2.0 Scope

Applies to the Town of Essex WDS and is limited to the assessment of potential drinking water health hazards. The approach to addressing other potential hazards is set out in QMS Procedure 18:01 Emergency Management.

3.0 Responsibility

- All employees of Essex Environmental Services
- QMS Representative(s)

4.0 Definitions

Critical Control Point (CCP) – an essential step or point in the subject system at which control can be applied by the operating authority to prevent or eliminate a drinking-water health hazard or to reduce it to an acceptable level

Hazardous Event – an incident or situation that can lead to the presence of a hazard

Hazard – a source of danger or a property that may cause drinking water to be unsafe for human consumption; may be biological, chemical, physical or radiological in nature

Control Measure - includes any processes, physical steps or other contingencies that have been put in place to prevent or reduce a hazard before it occurs

Likelihood – the probability of a hazard or hazardous event occurring

Consequence – the potential impact to public health and/or operation of the drinking water system if a hazard/hazardous event are not controlled

Threshold Number – numerical value assigned by the assessment team to a high risk event. Events ranked at or above this limit require further investigation to determine whether they are critical control points.

5.0 Procedure

5.1 The QMS Representative(s) ensures that a risk assessment is conducted at least once every thirty-six months and is also responsible for coordinating the risk assessment and

ensuring that all documents and records related to the risk assessment activities are maintained.

5.2 For each of the system's activities/process steps, potential hazardous events and associated hazards (possible outcomes) that could impact the system's ability to deliver safe drinking water are identified. At a minimum, potential hazardous events and associated hazards as identified in the most current version of the Ministry of the Environment, Climate Change and Parks (MECP) document titled "Potential Hazardous Events for Municipal Residential Drinking Water Systems" (as applicable to the system type) must be considered.

5.3 For each of the hazardous events, control measures currently in place in the system to eliminate the hazard or prevent it from becoming a threat to public health are specified.

Note: Some hazards/hazardous events may have step-by-step emergency plans associated with them. These emergency plans are further described in QMS Procedure 18:01 Emergency Management.

5.4 Critical Control Points (CCPs) for the system are determined by evaluating and ranking the hazardous events for the activities/process steps. Consideration is given to existing control measures (including the reliability and redundancy of equipment), each hazardous event is assigned a value for the likelihood and a value for the consequence of that event occurring based on the following criteria:

Value	Likelihood of Hazardous Event Occurring
1	**Little or no potential** (rare, low risk, has not occurred) – more than every 25 years
2	**Rare** (infrequent, not likely, rare) **-** 5 to 25 years
3	**Infrequent** (moderate likely, occasional, possible) – 1 to 5 years
4	**Frequent** (often, highly likely, routinely, occasional**) -** monthly to a year
5	**Routine** (immediate, extremely likely, frequent) **–** daily to weekly

Value	Consequence of Hazardous Event Occurring
1	**Insignificant** – Little or no disruption to normal operations, no impact on public health
2	**Minor** – Significant modification to normal operations but manageable, no impact on public health
3	**Moderate** – Potentially reportable, corrective action required, potential public health impact, disruption to operations is manageable
4	**Major** – Reportable, system significantly compromised and abnormal operations if at all, high level of monitoring and corrective action required, threat to public health
5	**Catastrophic** – Complete failure of system, water unsuitable for consumption

The likelihood and consequence values are multiplied to determine the risk value (ranking) of each hazardous event. Hazardous events with a ranking of 9 or greater are considered high risk.

5.5 Hazardous events and rankings are reviewed and any activity/process step will be identified as an additional CCP if all of the following criteria is met:

- ✓ The associated hazardous event has a ranking of 9 or greater;
- ✓ The associated hazardous event can be controlled through control measure(s);
- ✓ Operation of the control measures can be monitored and corrective actions can be applied in a timely fashion;
- ✓ Specific control limits can be established for the control measure(s); and
- ✓ Failure of the control measures would lead to immediate notification of Medical Officer of Health (MOH) or MECP or both.

5.6 The outcomes of the risk assessment are documented as per Procedure 8:01 Risk Assessment Outcomes.

5.7 At least once every calendar year, the QMS Representative(s) facilitates the verification of the currency of the information and validity of the assumptions used in the risk assessment in preparation for the Management Review. When performing this review, the following may be considered:

- Process/equipment changes
- Reliability and redundancy of equipment
- Emergency situations/service interruptions
- CCP Deviations
- Audit and/or inspection results

6.0 Related Documents

SOPs related to QMS
Municipal Emergency Response Plan
System Map
AWWA/Industry Standards
Applicable Municipal Bylaws
Contract Agreements with the UWSS and OCWA for sampling and monitoring
MECP's "Potential Hazardous Events for Municipal Residential Drinking Water Systems"
MECP's "Procedure for Disinfection of Drinking Water in Ontario"

7.0 Revision History

Date	Revision #	Reason for Revision
14-May-13	2	Updated Andy Graf's position in the header
22-Apr-14	3	Reviewed procedure and adjusted header
07-Jul-15	4	Updated Table 1: Risk Assessment Table as per external audit
14-Feb-19	5	Updated changes are per DWQMS version 2.0

Table 1: Risk Assessment Table

Activity/ Process Step	MECP Potential Event/Hazard Reference # (see Table 4)	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
Distribution	7	Low System Pressure	Potential for unsafe drinking water	• Log and monitor through customer complaints • SOP# 5: Water Service – Low Pressure/Service Leaks • SOP# 13: Emergency Interconnect • Cloud based real time hydrant monitoring	2	4	8	☐ Yes – CCP ☒ No
Distribution	2, 7	Watermain Break	Potential for unsafe drinking water	• Competent Staff • SOP# 5: Water Service – Low Pressure/Service Leaks • SOP# 12: Watermain Break – Repairs to Potentially Contaminated Watermains – Customer Calls • Essential Supplies and Services Contact List	4	3	12	☐ Yes – CCP ☒ No – no control available at this point; therefore not a CCP
Distribution	N/A	Adverse Water Result in the Distribution System (as defined in O. Reg. 170/03)	Potential for unsafe drinking water	• Essential Supplies and Services Contact List • SOP#1: Fire Hydrant Flushing • SOP#4: Sample Collection • Monthly Monitoring Program	3	3	9	☐ Yes – CCP ☒ No – no control available at this point; therefore not a CCP
Distribution	2, 5	Contamination of source water at the Harrow WTP	Water supply shortfall	• Essential Supplies and Services Contact List • Emergency Response Plan • SOP# 13: Emergency Interconnect	1	5	5	☐ Yes – CCP ☒ No

Activity/ Process Step	MECP Potential Event/Hazard Reference # (see Table 4)	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
Distribution	N/A	Loss of Supply	Low pressure leading to potential contamination	• Emergency Response Plan • Essential Supplies and Services Contact List • SOP# 5: Water Service – Low Pressure/Service Leaks • SOP#13: Emergency Interconnect	1	4	4	☐ Yes – CCP ☒ No
Distribution	N/A	Aging Infrastructure (decrease in flow delivery as a result of fouling/build-up inside pipes and water main breaks)	Potential for unsafe drinking water, reduced flows, pipeline breaks	• Infrastructure Maintenance and Renewal Program (Annual Budget) • Essential Supplies and Services Contact List • SOP #5: Water Service – Low Pressure/Service Leaks • SOP #12: Watermain Break – Repairs due to Potentially Contaminated Watermains – Customer calls	2	3	6	☐ Yes – CCP ☒ No No Control limits However adequate control measures are in place
Distribution	8	Cross Connection to Non Municipal Water	Potential for unsafe drinking water	• Back Flow Prevention By-Law requiring annual inspections • Essential Supplies and Services Contact List • SOP#1: Fire Hydrant Flushing • SOP#4: Sample Collection	2	3	6	☐ Yes - CCP ☒ No - Municipality oversees back flow prevention program under Provincial Building Code
Distribution	11	Failure to maintain secondary disinfection	Potential for unsafe drinking water	• Essential Supplies and Services Contact List • SOP#1: Fire Hydrant Flushing • SOP#4: Sample Collection • Monthly Monitoring Program	3	3	9	☐ Yes – CCP ☒ No – monitored by OCWA therefore not a CCP
Distribution	6	Unauthorized use of Fire Hydrants	Potential for unsafe drinking water	• Observant staff	2	3	6	☐ Yes – CCP ☒ No – CCP

Activity/ Process Step	MECP Potential Event/Hazard Reference # (see Table 4)	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
Distribution	N/A	Water Main Dead Ends	Potential for unsafe drinking water	• SOP#1: Fire Hydrant Flushing • SOP#4: Sample Collection • Monthly Monitoring Program	3	3	9	☐ Yes – CCP ☒ No – CCP
Distribution	6	Vandalism	Potential for unsafe drinking water	• Essential Supplies and Services Contact List • SOP#1: Fire Hydrant Flushing • SOP#4: Sample Collection	2	3	6	☒ No – no control available at this point; therefore not a CCP
Distribution	6	Terrorism	Potential for unsafe drinking water	• Essential Supplies and Services Contact List • SOP# 13: Emergency Interconnect • SOP#4: Sample Collection	1	5	5	☐ Yes – CCP ☒ No – CCP
Distribution	7	Cybersecurity	Potential for unsafe drinking water	• Backflow Prevention By-Law • SOP#1 Fire Hydrant Flushing • SOP#4 Sample Collection • Internal IT department	1	5	5	☐ Yes – CCP ☒ No – CCP
Distribution	8	Failure of Backflow Device	Potential for unsafe drinking water	• Back Flow Prevention By-Law requiring annual inspections • Essential Supplies and Services Contact List • SOP#1: Fire Hydrant Flushing • SOP#4: Sample Collection	2	3	6	☐ Yes - CCP ☒ No Municipality oversees back flow prevention program under Provincial Building Code
Distribution	1, 4	Bio-film Formation	Potential for unsafe drinking water	• Essential Supplies and Services Contact List • SOP#1: Fire Hydrant Flushing • SOP#4: Sample Collection	2	3	6	☐ Yes – CCP ☒ No – CCP
Distribution	N/A	Contamination through construction/repair	Potential for unsafe drinking water	• Essential Supplies and Services Contact List • SOP#1: Fire Hydrant Flushing	2	3	6	☐ Yes – CCP ☒ No – CCP

Activity/ Process Step	MECP Potential Event/Hazard Reference # (see Table 4)	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
		activities from unapproved or dirty equipment		• SOP#7: Commissioning New Watermain • SOP#4: Sample Collection				
Distribution	1, 3, 4	Increased average water temperature during summer months as a results of climate change	Potential for unsafe drinking water	• Essential Supplies and Services Contact List • SOP#1: Fire Hydrant Flushing • SOP#4: Sample Collection	2	2	4	☐ Yes – CCP ☒ No – CCP
Distribution	1, 3, 4	Sustained extreme temperatures (deep freeze)	Potential for unsafe drinking water	• Essential Supplies and Services Contact List	1	2	2	☐ Yes – CCP ☒ No – CCP

Table 2: Identified Critical Control Points (CCPs)

CCP	Critical Control Limits	Monitoring Procedures	Response, Reporting and Recording Procedures
No Critical Control Points were identifies in this Risk Assessment	No Critical control points identified	N/A	N/A

Table 3: Record of Annual Review/36-Month Risk Assessment

The Drinking Water Quality Management Standard (DWQMS) requires that the currency of the information and the validity of the assumptions used in the risk assessment be verified at least once a year. In addition, the risk assessment must be conducted at least once every thirty-six months.

Date of Activity	Type of Activity	Participants	Summary of Results
25-March-14	*Annual Review*	*Andy Graf and Chris Nepszy*	Reviewed during Management Review. Decided to add vandalism as a hazardous event as identified as an OFI from the on-site verifications audit.
20-February-15	*Annual Review*	*Andy Graf and Chris Nepszy*	Reviewed during Management Review.
12-February-16	*36 Month Review*	*Andy Graf and Chris Nepszy*	Conducted 36 month review – No changes.
16-February-17	*Annual Review*	*Andy Graf and Chris Nepszy*	Reviewed during Management Review.
17-May-18	*Annual Review*	*Andy Graf and Karen Burgess*	Completed annual review – no changes
14-Feb-19	36-month Risk Assessment	*Andy Graf and Chris Nepszy*	All Activities/Process Steps were re-assessed and new hazardous events and hazards identified (including those in the MOECC's "Potential Hazardous Events for Municipal Residential Drinking Water Systems").
10-Aug-20	Annual Review	*Andy Graf and Kevin Girard*	Completed annual review – no changes
30-Nov-21	Annual Review	*Andy Graf, Kevin Girard, Doug Sweet, Karen Burgess, Warren Higgins*	Completed annual review as part of Management Review. No changes were identified.
07-Oct-22	36- Month Risk Assessment/Management Review	*Rob Mackie and Kevin Girard*	All Activities/Process Steps were re-assessed, and some consequences and likelihoods were modified during Management Review
11-Nov-23	Annual Review	*Rob Mackie and Kevin Girard*	Completed annual review, "Contamination through construction/repair activities" likelihood downgraded due to newly revised SOP#7 Commissioning New Watermain
15-Oct-24	Annual Review	*Rob Mackie and Kevin Girard*	Completed Annual Review, Control Measures in Table 1 were amended to reflect new Monthly Monitoring program. Grammatical changes throughout procedure.
20-Oct-25	36-Month Risk Assessment/Management Review	*Rob Mackie and Kevin Girard*	All Activities/Process Steps were re-assessed, and some consequences and likelihoods were modified during Management Review, Control measure added (low System pressure)

Table 4: Potential Hazardous Event/Hazard Reference Numbers (based on MECP's "Potential Hazardous Events for Municipal Residential Drinking Water Systems" dated April 2022)

If the hazardous event/hazard is not applicable to this drinking water system (DWS), it will be noted in the first column of this table.

System Type (indicate all that apply to this DWS)		Reference Number	Description of Hazardous Event/Hazard
X	All Systems	1	Long Term Impacts of Climate Change
X	All Systems	2	Water supply shortfall
X	All Systems	3	Extreme weather events (e.g., tornado, ice storm)
X	All Systems	4	Sustained extreme temperatures (e.g., heat wave, deep freeze)
X	All Systems	5	Chemical spill impacting source water
X	All Systems	6	Terrorist and vandalism actions
x	All Systems	7	Cybersecurity Threats
X	Distribution Systems	8	Sustained pressure loss
X	Distribution Systems	9	Backflow
N/A	Treatment Systems	10	Sudden changes to raw water characteristics (e.g., turbidity, pH)
N/A	Treatment Systems	11	Failure of equipment or process associated with primary disinfection (e.g., coagulant dosing system, filters, UV system, chlorination system)
N/A	Treatment Systems and Distribution Systems providing secondary disinfection	12	Failure of equipment or process associated with secondary disinfection (e.g., chlorination equipment, chloramination equipment)

Revision History

Date	Revision #	Reason for Revision
23-Jan-09	0	Initial risk assessment conducted
17-Sept-12	1	Review
14-May-13	2	Implement findings from Internal Audit
22-Apr-14	3	Implemented Vandalism as a hazardous event
07-July-15	4	Terrorism, Failure of a Backflow Device, Bio-film and Contamination through construction/repair was added to Table 1.
14-Feb-19	5	Updated changes are per DWQMS version 2.0
07-Oct-22	6	36-month Risk assessment reviewed, some consequences and likelihoods were modified
05-Sept-2023	7	Updated Table 1 + Table 4 to represent MECPP Potential Hazardous Events for Municipal Residential Drinking Water Systems (2022)
11-Nov-2023	8	Updated Table1 during Annual Review

15-Oct-24	9	Update Table 1 during Annual Review, grammatical changes from MOECC to MECP
20-Oct-25	10	Updated Table 1 during 36 Month review

PERSONNEL COVERAGE

1. Purpose

To describe the procedure for ensuring that sufficient and competent personnel are available for duties that directly affect drinking water quality.

2. Scope

Applies to operations personnel at the Essex Environmental Services.

3. Responsibility

- All employees of the Essex Environmental Services
- QMS Representative(s)

4. Definitions

Competence – The combination of observable and measurable knowledge, skills, and abilities which are required for a person to carry out assigned responsibilities.

5. Procedure

5.1 The Manager, Environmental Services ensures that personnel meeting the competencies identified in the Competency Requirements Table are available for duties that directly affect drinking water quality.

5.2 The Essex Environmental Services is staffed by personnel Monday through Thursday, 7:00 am to 4:00 pm and on 7:00am to 11:00 am Fridays.

5.3 All after hours and weekend calls are automatically forwarded to a contracted answering service. The operator has a contact list of all Essex WDS personnel including home and cell phone numbers. The first responding employee will determine the severity of the situation and if necessary, will call additional staff

5.4 The Essex WDS personnel are assigned to act as and fulfill the duties in accordance with SDWA O. Reg. 128/04. The Manager, Environmental Services is the primary ORO. All Class II operators are designated as OIC. ORO responsibilities are assigned to Class II operators in the absence of The Manager. When a change in ORO designation occurs, an ORO memo is issued via email to operators, Senior Management and OCWA.

5.5 In the event of a work stoppage the Manager, Environmental Services and will perform day-to-day operations and maintenance.

6.0 Related Documents

Collective Agreement
ORO Memo

7.0 Revision History

Date	Revision #	Reason for Revision
23-Jan-09	0	Procedure issued
17-Sept-12	1	Document Review
14-May-13	2	Updated Andy Graf's position in the header, 5.1, 5.4 and 5.5
22-Apr-14	3	Reviewed procedure and adjusted header
05-July-23	4	Updated Staffing time and ORO designation

COMMUNICATIONS

1.0 Purpose

To describe the Essex Environmental Services procedure for QMS-related communications between Top Management and the Owner, Operating Authority personnel, Suppliers and the public.

2.0 Scope

Applies to the internal and external communications regarding the Quality Management System (QMS) implemented at Essex Environmental Services

3.0 Responsibility

- QMS Representative(s)
- Operators

4.0 Definitions

Public – includes subject system consumers and stakeholders

5.0 Procedure

5.1 The status of the QMS and its effectiveness shall be communicated to the owner with the results from the Management Review.

5.2 Essex Environmental Services will communicate the QMS to all employees as part of the implementation process. New hires will receive QMS awareness training. The operational plan and procedures will be made available to all employees.

5.3 The QMS policy will be posted on the Owner's website and upon request.

5.4 Where appropriate, information on the QMS requirements will be communicated to suppliers.

6.0 Related Documents

Management Review

7.0 Revision History

Date	Revision #	Reason for Revision
23-Jan-09	0	Procedure issued
17-Sept-12	1	Document Review
14-May-13	2	Update Andy Graf's position in the header
22-Apr-14	3	Reviewed procedure and adjusted header

ESSENTIAL SUPPLIES AND SERVICES

1.0 Purpose

To describe the Essex Environmental Services procedure for procurement and for ensuring the quality of essential supplies and services.

This procedure identifies the supplies and services deemed essential to the delivery of safe drinking water and how to ensure the quality of essential supplies and services that can affect water quality.

2.0 Scope

Applies to essential supplies and services pertaining to the Essex Environmental Services as identified in this procedure.

3.0 Responsibilities

- QMS Representative(s)
- Operator

4.0 Definitions

Essential Supplies and Services – are goods and people coming in from outside of the drinking-water system that are essential for the quality and safety of drinking water.

Supplier – an organization or person that provides an essential supply product or service.

5.0 Procedure

5.1 Essential supplies and services for the Essex Environmental Services are listed on the Essential Supplies and Services Contact List posted at the Essex Environmental Services Office. The list is reviewed at least annually during the Internal Audit/Management Review and is updated as required by the delegated QMS Representative(s).

5.2 An approved list of suppliers and contractors is maintained throughout the year. All suppliers and contractors must adhere to the municipal policies and procedures.

5.3 All process components/equipment provided by the supplier must meet applicable regulatory requirements and industry standards for use in the drinking water system prior to their installation.

5.4 All third party drinking water services are provided by accredited and licensed laboratories. Sampling is performed by certified operators. Calibration is performed by qualified personnel. Certified operators supervise contracted services.

5.5 The supplies and services requirement will be communicated to all relevant personnel in operating authority. Purchasing policies requirement will be communicated to suppliers and service providers.

6.0 Related Documents

Town of Essex – Procurement Policy

7.0 Revision History

Date	Revision #	Reason for Revision
23-Jan-09	0	Procedure issued
17-Sept-12	1	Document Reviewed
14-May-13	2	Implement findings from the internal audit
22-Apr-14	3	Reviewed procedure and adjusted header
26-Jul-16	4	Implement findings from the external audit
07-July-23	5	Updated procedure

REVIEW AND PROVISION OF INFRASTRUCTURE

1.0 Purpose

To describe Essex Environmental Services procedure for reviewing the adequacy of infrastructure necessary to operate and maintain the drinking water distribution system.

2.0 Scope

Applies to review and provision of infrastructure at Essex Environmental Services

3.0 Responsibility

- QMS Representative(s)

4.0 Definitions

Infrastructure – the set of interconnected structural elements that provide the framework for supporting the operation of the drinking water system, including buildings, workspace, process equipment, hardware, software and supporting services, such as transport or communication.

Rehabilitation – the process of repairing or refurbishing an infrastructure element.

Renewal – the process of replacing the infrastructure element with new elements.

5.0 Procedure

5.1 At least once every calendar year, the QMS Representative(s) conduct a review of the drinking water system's infrastructure to assess its adequacy for the operation and maintenance of the system.

5.2 The outcomes of the risk assessment documented as per OP-08 are also considered as part of this review.

5.3 A summary of maintenance and capital recommendations will be submitted to the owner for review and comment. Upon authorization, timelines and responsibilities for implementation of items identified will be documented and scheduled.

5.4 The QMS Representative(s) will include the results of the recommendations and proposed timelines at the Management Review.

6.0 Related Documents

Annual Budget
Management Review Documents

7.0 Revision History

Date	Revision #	Reason for Revision
23-Jan-09	0	Procedure issued
Sept. 13	1	Document Review
14-May-13	2	Updated Andy Graf's position in the header
22-Apr-14	3	Reviewed procedure and updated header
14-Feb-19	4	Included the requirements of DWQMS version 2.0

SAMPLING, TESTING AND MONITORING

1.0 Purpose

To describe the Essex Environmental Services procedure for sampling, testing and monitoring for process control and finished drinking water quality.

2.0 Scope

Applies to sampling, testing and monitoring for the Essex Environmental Services.

3.0 Responsibilities

- QMS Representative(s)
- Operator

4.0 Definitions

None

5.0 Procedure

5.1 All sampling, monitoring and testing is conducted at a minimum in accordance with SDWA O. Reg. 170/03. Adverse water quality incidents are responded to and reported as per regulations.

5.2 Samples are submitted to an accredited and licensed laboratory.

The sampling schedule is maintained by Union Water Supply System (UWSS) and Harrow-Colchester South Water System (HCSWS). OCWA performs that service on behalf of UWSS and the HCSWTP.

Hardcopy reports are maintained at UWSS and HCSWTP.

5.3 In-house sampling and flow monitoring activities are conducted on an as-needed basis by a certified operator and as shown in Table 1.

Table 1 – In-House Sampling and Testing Schedule

Parameter	***Location***	***Frequency***
Chlorine Residual	Hydrants, Blow-offs and Dead Ends	As required by Town of Essex Water Distribution System operator

The results of these tests are located at the Essex Environmental Services Office.

5.4 Pressures and secondary disinfectant residual levels are continuously monitored by UWSS and HCSWTP.

5.5 No additional sampling is required for the Essex Water Distribution System.

No challenging conditions have been identified in this system.

Upstream sampling, testing and monitoring activities are the responsibility of the UWSS and HCSWTP.

There is no relevant downstream sampling, testing and monitoring activities that take place and affect how the Essex Water Distribution System is operated.

5.6 Sampling, testing and monitoring results are readily accessible at the UWSS and HCSWTP.

As a minimum, the Town of Essex is provided with an annual summary of sampling, testing and monitoring results through the SDWA O. Reg. 170/03 section 11 and schedule 22 reports and through the Management Review process outlined in 20:01 Management Review.

6.0 Related Documents

SOP's related to QMS
Chlorine Residuals (In House)

7.0 Revision History

Date	Revision #	Reason for Revision
23-Jan-09	0	Procedure issued
17-Sept-12	1	Document Review
14-May-13	2	Implement findings from the internal audit
22-Apr-14	3	Reviewed procedure, updated section 5.3 and the header

MEASUREMENT AND RECORDING EQUIPMENT CALIBRATION AND MAINTENANCE

1.0 Purpose

To describe the Essex Environmental Services procedure for the calibration and maintenance of measurement and recording equipment.

2.0 Scope

Applies to the measurement and recording equipment at Essex Environmental Services.

3.0 Responsibility

- Manager, Environmental Services

4.0 Definitions

None

5.0 Procedure

5.1 All measurement and recording equipment are checked monthly through an Instrument Performance Verification.

5.2 Calibration and maintenance activities are carried out in accordance with manufacturer's instructions for DPD-Chlorine Secondary Standards Kit.

Table 1 - Measurement and Recording Equipment Calibration and Maintenance Information

Sampling/Testing or Monitoring Parameter	Equipment	Method	Frequency	Schedule	Results
Chlorine Residuals	Pocket Colorimeter	Manufacturers Spec Color Standard	Monthly	As per Work Order	Hard copy in Essex Environmental Services office

5.3 Calibration and maintenance records and maintenance/equipment manuals are maintained as per 5:01 Document and Records Control.

6.0 Related Documents

Instrument Performance Verification Hach Colorimeters Form
Chlorine Residuals (In House)

7.0 Revision History

Date	Revision #	Reason for Revision
23-Jan-09	0	Procedure issued
17-Sept-12	1	Document Reviewed
14-May13	2	Updated Andy Graf's position
22-Apr-14	3	Reviewed procedure and updated header
07-July-2023	4	Updated procedures
04-June-2025	5	Updated related documents

essex	Essex Environmental Services Procedure 18:01 Emergency Management	Proc.: 18:01 Issued: 22-Apr-14 Rev.#: 3 Pages: 1 of 2
Reviewed by: Essex Environmental Services Director, Infrastructure Services Manager, Environmental Services		***Approved by***: Essex Environmental Services Director, Infrastructure Services Manager, Environmental Services

EMERGENCY MANAGEMENT

1.0 Purpose

To describe the Essex Environmental Services procedure for maintaining a state of emergency preparedness.

2.0 Scope

Applies to potential emergency situations or service interruptions identified for the water system operated by Essex Environmental Services.

3.0 Responsibility

- QMS Representative(s)
- Operator

4.0 Definitions

Municipal Emergency Plan – The emergency plan required by the Emergency Management and Civil Protection Act and adopted as a by-law by council, governing the provision of necessary services during and emergency and the procedures under and the manner in which employees of the municipality and other persons will respond to the emergency.

Emergency – a potential situation or service interruption that may result in the loss of the ability to maintain a supply of safe drinking water to consumers.

Emergency Response – the effort to mitigate the impact of an emergency on consumers

5.0 Procedure

5.1 The Manager, Environmental Services maintains the Emergency Response Plan.

5.2 Table 1 describes the list of potential emergency situations or service interruptions. For each of these emergency situations/service interruptions, a step-by-step emergency plan/SOP used for emergency defining the processes for response and recovery is in place.

TABLE 1

POTENTIAL EMERGENCIES	
Description of Emergency	**Potential Outcome**
Contamination of water either from the source or in the distribution system (i.e. low pressure, main break, loss of supply, fire, etc.)	Health risk, contamination of treated water or environment, service disruption Please refer to SOP Index to obtain appropriate SOP to be used

5.3 Appropriate personnel are trained on this procedure and on specific emergency situations on an ongoing basis. Personnel are also trained by reviewing and testing the SOPs (used for emergencies). All training/testing is documented.

5.4 Operating Authority and Owner roles and responsibilities for Emergency Management are set out in the Roles and Responsibilities table in Element 9.

5.5 Relevant sections of the Municipal Emergency Plan, which may also contain additional information on emergency roles and responsibilities, for those situations which affect drinking water are contained

5.6 The Essential Supplies and Services Contact List is maintained at the Essex Environmental Services, available to all staff and updated at least annually.

5.7 As appropriate, communications during emergency situations or service interruptions are set out in the individual emergency plans/ SOPs/ communication protocol.

6.0 Related Documents

Emergency Response Plan
Records of Training/testing/plan updates
Essential Supplies and Services Contact List
SOPs (relevant)

7.0 Revision History

Date	Revision #	Reason for Revision
23-Jan-09	0	Procedure issued
17-Sept-12	1	Document Review
14-May-13	2	Update Andy Graf's position
22-Apr-14	3	Reviewed procedure and updated header

	Essex Environmental Services Procedure 19:01 Internal Audits	Proc.: 19:01 Issued 07-April-22 Rev.#: 5 Pages: 1 of 2
Reviewed by: Essex Environmental Services Director, Infrastructure Services Manager, Environmental Services	***Approved by***: Essex Environmental Services Director, Infrastructure Services Manager, Environmental Services	

Internal Audits

1.0 Purpose

To describe the Town of Essex procedure for conducting Internal Audits at the facility level that evaluates the conformance to the requirements of the Drinking Water Quality Management Standard (DWQMS).

2.0 Scope

This procedure applies to the process of conducting internal audits at the Essex Environmental Services.

3.0 Responsibility

- QMS Representative(s)

4.0 Definitions

Audit – A systematic and documented verification process that involves objectively obtaining and evaluating documents and processes to determine whether a quality management system conforms to the requirements of this Standard.

Non-conformance – the non-fulfillment of a DWQMS requirement

5.0 Procedure

5.1 The QMS Representative(s) maintains the Internal Audit Procedure and schedules the internal QMS audit that addresses all DWQMS elements is conducted for the facility at least once every calendar year. The QMS Representative(s) selects personnel to perform the audit considering adequate skills, training and/or experience.

5.2 The Auditor evaluates conformity of the QMS with the requirements of the DWQMS by asking questions which are designed to encompass all of the requirements of the DWQMS.

5.3 The auditor will use a check list developed from MOE's DWQMS and supporting documentation, to ensure all 21 Elements of the DWQMS are addressed. This step will include interviews with select staff of the Operating Authority, observation of operating practices, and review of documents. The auditor will document the audit findings in a written report to the Operating Authority. In order to maintain objectivity, the report will be reviewed by management prior to submitting.

5.4 The auditor reviews the facility's approved policies and procedures, the results of previous internal and external QMS audits, the status of corrective and preventive actions and other QMS-related documentation prior to the audit.

5.5 When nonconformity is identified through the internal audit process, an action plan to rectify the issue is developed by the QMS Representative(s), specifying responsibility and a target date for resolution. The Manager, Environmental Services monitors progress of the action plan related to the identified nonconformity until it is fully resolved.

5.6 The QMS Representatives ensure that results of the audit are included as input to the management review process.

6.0 Related Documents

Audit Reports
Action Plans

7.0 Revision History

Date	Revision #	Reason for Revision
23-Jan-09	0	Procedure issued
17-Sept-12	1	Document Review
14-May-13	2	Update Andy Graf's position
22-Apr-14	3	Reviewed procedure and updated header
14-Feb-19	4	Changed 'on an annual basis' to 'at least once every calendar year'.
07-April-22	5	Added Objective review.

	Essex Water Services Procedure 20:01 Management Review	Proc.: 20:01 Issued 14-Feb-19 Rev.#: 4 Pages: 1 of 3
Reviewed by: Essex Environmental Services Director, Infrastructure Services Manager, Environmental Services	***Approved by***: Essex Environmental Services Director, Infrastructure Services Manager, Environmental Services	

Management Review

1.0 Purpose

To describe the Town of Essex procedure for a Management Review of the Quality Management System (QMS) at the facility level.

2.0 Scope

Applies to the review by Top Management of the Town of Essex of the QMS implemented at the Essex Environmental Services.

3.0 Responsibility

- QMS Representative(s)

4.0 Definitions

Management Review – a process where a higher level of managers in the operating authority considers various indicators within the QMS.

5.0 Procedure

5.1 The QMS Representative(s) determines a suitable frequency for Management Review meetings for the drinking water system. As a minimum, reviews must be conducted at least once every calendar year.

5.2 The standing agenda for Management Review meetings is as follows:

a) Incidents of regulator non-compliance,
   - MOE inspection reports, annual reports to the MOE

b) Incidents of adverse drinking water tests,
   - Annual reports and adverse reports to the MOE

c) Deviations from critical control point limits and response actions,
   - Adverse reports to the MOE, call-in reports, logbook entries

d) The effectiveness of the risk assessment process,
   - Review of Summary of Rick Assessment Outcomes

e) Internal and third-party audit results,
   - Audit reports and action plans

f) Results of emergency response testing,
   - Facility Emergency Plan, training records, related test documentation

g) Operational Performance,
   - Moe Inspection rating reports

h) Water supply and drinking water quality trends,
   - Drinking Water facility description in Operational Plan, annual reports to MOE, flushing trends, consumer feedback

i) Follow-up on action items from previous Management Reviews,
   - Minutes and action plans

j) The status of management action items identified between reviews,
   - Action plans, memos, correspondence to Operating Authority staff

k) Changes that could affect the QMS,

l) Consumer feedback,
   - Community complaints, logbook

m) The resources needed to maintain the QMS,
   - Staff

n) The results of the infrastructure review,
   - Capital Works Recommendations (See element 14)

o) Operational Plan currency, content and updates, and
   - Operational Plan including QMS Procedures

p) Staff suggestions
   - Correspondence

q) Consideration of applicable best management practices

The QMS Representative(s) coordinates the Management Review and ensures that the agenda with identified responsibilities is distributed to all participants in advance of the Management Review meeting along with any related reference materials.

5.3 The Management review participants review all data presented and make recommendations and/or initiate action plans to address identified deficiencies as appropriate.

5.4 The QMS Representative(s) ensures that minutes and action plans resulting from the Management Review meeting are prepared and distributed to the CAO.

5.5 The QMS Representative(s) monitor the progress and documents the completion of action plans resulting from the Management Review.

6.0 Related Documents

Management Review Documents
Audit Reports

7.0 Revision History

Date	Revision #	Reason for Revision
23-Jan-09	0	Procedure issued
17-May-12	1	Document Review
14-May13	2	Update Andy Graf's position
22-Apr-14	3	Reviewed procedure and updated header
14-Feb-19	4	Changed 'once every 12 months' to 'once every calendar year'