

CITY OF THOROLD

DRINKING WATER QUALITY MANAGEMENT SYSTEM

OPERATIONAL PLAN

Thorold (Decew) Distribution System No. 220004313

Thorold (Port Robinson Area) Distribution System No. 260049582

Thorold (South End) Distribution System No. 260049621

Version 21: February 24, 2023



DFA Infrastructure International Inc. / Corporation of the City of Thorold

Endorsement of Operational Plan

Owner's Endorsement:

Top Management Endorsement:

Signature

Title: Mayor of Thorold

Date: _____

Signature

Title: Manager of Public Works

Date: _____

Operational Plan Revision Log


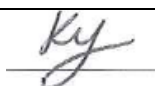
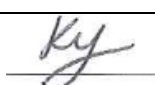
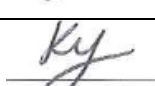
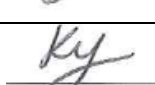

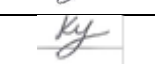
Revision No.	Date	Changes Made	Approved By:	Initial(s)
Original	April 21, 2009	Original Version	J. Colasurdo	
Rev. #1	Dec. 13, 2010	Revised and updated procedures	J. Colasurdo	
Rev. #2	May 31, 2011	Revised and updated procedures and Appendices	J. Colasurdo	
Rev. #3	Sept. 27, 2011	Revised Section 15, added procedure E-12 to O&M Manual	J. Colasurdo	
Rev. #4	March 28, 2012	Minor revisions as per corrective action reports provided by MOE	J. Colasurdo	
Rev. #5	Oct. 11, 2012	Removal of booster pump in Decew system and minor updates	J. Colasurdo	
Rev. #6	March 6, 2013	Revised and updated procedures	J. Colasurdo	
Rev. #7	March 5, 2014	Revised and updated procedures	J. Colasurdo	
Rev. #8	Dec. 8, 2014	Minor revisions resulting from 2014 Internal Audit (DFA)	J. Colasurdo	
Rev #9	Oct. 22, 2015	Minor revisions resulting from annual review	J. Colasurdo	
Rev. #10	Dec. 31, 2015	Minor revisions resulting from annual review	J. Colasurdo	
Rev. #11	June 30, 2016	Minor revisions resulting from annual review	J. Colasurdo	
Rev. #12	Dec. 31, 2016	Minor revisions resulting from annual review	J. Colasurdo	
Rev. #13	June 30, 2017	Re-categorization of South End System and other minor updates	J. Colasurdo	
Rev.#14	January 26, 2018	Minor revisions and updates including department and job title names	J. Colasurdo	
Rev.#15	December 14, 2018	Minor revisions and updates including department and job title names	K.Yungblut	
Rev.#16	June 13, 2019	Minor revisions and updates including QMS Policy wording and Section 2 wording.	K.Yungblut	
Rev. #17	February 12, 2020	Document Control	K.Yungblut	
Rev. #18	September 26, 2020	Document Control, minor revisions; updated website domain and added verbiage to section #13	K.Yungblut	
Rev. #19	February 25, 2021	Updated 6 Drinking Water System, South End now has appropriate permits, Updated 16; File Location, Updated Table of Contents	K.Yungblut	
Rev. #20	March 14, 2022	Referred to E-15 in Element 19	K.Yungblut	
Rev. #21	Feb 24, 2023	Additional language in Section 21	K.Yungblut	

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1 Quality Management System (QMS)

The City of Thorold (City) purchases all of its treated drinking water from the Regional Municipality of Niagara's (Region) Decew Falls Water Treatment Plant, Welland Treatment Plant and the Niagara Falls Water Treatment Plant. The Region is responsible for water supply, treatment, storage and transmission of treated drinking water to the Area Municipalities in Niagara, including the City of Thorold.

The City owns, operates and maintains three (3) water distribution systems that deliver drinking water to residents and other consumers within the City of Thorold.

This document is the Operational Plan (OP) for the City of Thorold Drinking Water Distribution Systems in accordance with the Drinking Water Quality Management Standard (DWQMS). It describes the plan for the overall quality management of the City's drinking water systems.

The Top Management for the QMS shall be represented by:

- The Water & Wastewater Compliance Supervisor
- The Manager of Public Works
- The Director of Public Works and Community Services
- The Manager of Engineering
- The Operations Water and Wastewater Supervisor

The Owner for the QMS shall be represented by:

- The Mayor & Council of the City of Thorold

2 Quality Management System Policy

A QMS policy statement was established by the City of Thorold with respect to the management of its water distribution systems and forms the basis of the City's QMS. This statement, which underscores the City's commitment to providing safe drinking water, is as follows:

"The City of Thorold is committed to the following:

- a. Ensuring a consistent supply of safe, high quality drinking water to all consumers.*
- b. Maintaining and continual improvement of the Drinking Water Quality Management System.*
- c. Meeting or surpassing applicable legislation and regulations."*

For policy review frequency and timeframes refer to electronic version of "Document and Records Control Table" on the City's network drive.

3 Commitment and Endorsement

The City of Thorold is committed to providing the resources and taking the actions necessary to meet its obligations with respect to safe drinking water as described in this Operational Plan.

The signatures on the operational plan endorsement page of this document demonstrate endorsement of the Operational Plan by the Owner and Top Management.

4 Quality Management System Representative

The Water & Wastewater Compliance Supervisor, is the appointed QMS Representative and is authorized to undertake the following:

- Administering the QMS including establishing, maintaining and updating required processes and procedures
- Reporting to Top Management on the success of the QMS and the need for improvements
- Ensuring that current versions of the QMS documents are being used
- Ensuring that all water system personnel are aware of the regulations and legislation that pertain to their duties related to the management and operation of the City's drinking water systems
- Promoting the awareness of the QMS to water system staff as deemed to be appropriate by the QMS Representative

In the absence of the Water & Wastewater Compliance Supervisor, the Manager of Public Works will act as the QMS representative

5 Document and Record Control

All documents and records will be kept current, legible, readily identifiable, retrievable, stored, protected, retained and disposed of in accordance with the procedures set out in the *Water Distribution Systems Operation & Maintenance Procedural Manual, Section E-7*

However, all records required by the Ministry of the Environment Ontario Regulations 128/04 and 170/03 (as amended) to demonstrate compliance with those regulations, will be established and maintained in accordance with the requirements of the respective regulations.

The Operational Plan (OP) shall be kept current and latest versions endorsed by the Owner. To avoid frequent reports to Council or to the Mayor (as the Owner's representative), the Director of Public Works and Community Services or the QMS Representative is delegated by Council, to act on behalf of the Owner for the purposes of endorsing adjustments to the OP that are minor in nature and do not change the intent of the OP. These types of changes would typically include, but are not limited to, administrative adjustments such as typos, minor edits and wording clarifications,

revisions to the organizational structure and other such minor adjustments as determined by the Director of Public Works and Community Services.

6 Drinking Water System

The City of Thorold purchases all of its treated water from the Regional Municipality of Niagara and is responsible for only the distribution of drinking water to users within the Urban Service Area of the City of Thorold. The Region is responsible for source water protection, treatment, storage (in plant and system storage) and transmission (including booster stations) to the City's drinking water distribution systems.

The City of Thorold owns and operates three (3) drinking water distribution systems. The operation of these three (3) drinking water distribution systems is delegated by Thorold City Council (representing the Owner) to City staff. The three (3) systems are:

1. The Thorold (Decew) Distribution System (No.220004313); and
2. The Thorold (Port Robinson Area) Distribution System (No.260049582)
3. The Thorold (South End) Distribution System (No. 260049621)

These three water distribution systems consist of various materials throughout the City such as cast iron, asbestos cement, polyvinyl chloride (PVC) and ductile iron pipe. The service area population for these three systems is approximately 13,500.

1. Thorold (Decew) Distribution System (No.220004313)

This drinking water distribution system receives treated water from the Decew Falls Water Treatment Plant (2700 Decew Road, Thorold) and has storage at the Thorold South Water Tower. These facilities are owned and operated by the Region. A process flow chart for this distribution system is included in Appendix A.

Treated water is delivered by the Region's transmission main directly to the City's distribution system and via the Thorold South Storage Tank. This Regional storage facility feeds the south portion of the City's distribution system including the Allanburg area.

The Allanburg Booster Pump, originally located on the west side of Highway 58 in Allanburg was decommissioned and permanently removed in July 2012. The Booster Pump became redundant due to the commissioning of the new Regional Niagara transmission main along Highway 58.

Descriptions of the Region's components of the Decew Falls Water Treatment Plant, its raw water source and the transmission and storage system are included in the Regional Municipality of Niagara's Operational Plan which should be referenced for further details.

The City relies on the Region to consistently provide treated water (in accordance with the Safe Drinking Water Act) to this system. This includes provision of the following:

- Source water protection under the Clean Water Act
- All water treatment processes

- Transmission, storage, booster pumping
- Disinfection and re-chlorination's necessary to maintain required chlorine residuals

The City operates this water distribution system in accordance with the requirements of O.Reg.170/03 for Large Municipal Residential Systems and relies on the ongoing sampling program to maintain safe drinking water quality standards within the water distribution system.

The Region also provides treated drinking water to the City of St. Catharines. The City of Thorold water distribution system is connected only to the Region's transmission system from which it receives treated water and is not connected to the St. Catharines distribution system. The City's distribution does not feed any downstream water distribution systems or sub-systems.

2. Thorold (Port Robinson Area) Distribution System (No.260049582)

This drinking water distribution system receives treated water from the Niagara Falls Water Treatment Plant (3599 Macklem St, Niagara Falls). This facility is owned and operated by the Region. A process flow chart for this distribution system is included in Appendix A.

The treated water is re-chlorinated at the Region's Port Robinson Chlorine Booster Station Facility to ensure that acceptable chlorine residuals can be maintained in the City's distribution system.

Descriptions of the Region's components of the Niagara Falls Water Treatment Plant, its raw water source and the transmission and storage system are included in the Regional Municipality of Niagara's Operational Plan which should be referenced for further details.

The City relies on the Region to consistently provide treated water (in accordance with the Safe Drinking Water Act) to this system. This includes provision of the following:

- Source water protection under the Clean Water Act
- All water treatment processes
- Transmission, storage, booster pumping
- Disinfection and re-chlorination as necessary to maintain required chlorine residuals

The City operates this water distribution system in accordance with the requirements of O.Reg.170/03 for Large Municipal Residential Systems and relies on the ongoing sampling program to maintain safe drinking water quality standards within the water distribution system.

This water distribution system is connected only to the Region's transmission system from which it receive treated water and does not feed any downstream water distribution systems or sub-systems.

3. Thorold (South End) Distribution System (No.260049621)

This drinking water distribution system receives treated water from the Welland Water Treatment Plant (4 Cross Street North, Welland). This facility is owned and operated by the Region. A process flow chart for this distribution system is included in Appendix A.

Descriptions of the Region's components of the Welland Water Treatment Plant, its raw water source and the transmission and storage system are included in the Regional Municipality of Niagara's Operational Plan which should be referenced for further details.

The City relies on the Region to consistently provide treated water (in accordance with the Safe Drinking Water Act) to this system. This includes provision of the following:

- Source water protection under the Clean Water Act
- All water treatment processes
- Transmission, storage, booster pumping
- Disinfection and re-chlorination as necessary to maintain required chlorine residuals

The City operates this water distribution system in accordance with the requirements of O.Reg.170/03 for Large Municipal Residential Systems and relies on the ongoing sampling program to maintain safe drinking water quality standards within the water distribution system.

This water distribution system is connected to the Region's transmission system from which it receives treated water and does not feed any downstream water distribution systems or sub-systems.

Detailed mapping of the City's three (3) drinking water distribution systems are available at the City of Thorold Public Works Building located at 1534 Beaverdams Road, Thorold.

7 Risk Assessment

A risk assessment procedure was developed and implemented by the City of Thorold for its water distribution systems. This procedure facilitates the following:

- Identifying potential hazardous events and associated hazards
- Assessing the risks associated with the occurrence of hazardous events
- Ranking the hazardous events according to their risk level
- Identifying Critical Control Points (CCPs)
- Verifying, at least once every calendar year, the currency of information and the validity of the assumptions used in the risk assessment
- Completion of a risk assessment every 36 months
- The redundancy and reliability of equipment

A copy of the City's Risk Assessment Procedure is included in *Water Distribution Systems Operation & Maintenance Procedural Manual, Section E-9*.

8 Risk Assessment Outcomes

Using the risk assessment procedure, the City developed and completed the Risk Assessment Outcomes Table which is included in Appendix B. This table includes the following:

- The identified potential hazardous events and associated hazards
- The assessed risks associated with the occurrence of the hazardous events
- The ranked hazardous events
- The identified control measures to address the potential hazards and hazardous events
- The identified critical control points and their respective critical control limits
- Procedures and/ or processes to monitor the critical control limits
- Procedures to respond to deviations from the critical control limits
- Procedures for reporting and recording deviations from the critical control limits.

9 Organizational Structure, Roles, Responsibilities and Authorities

Organizational Structure

In general, Thorold City Council has full authority over all the City's functions, programs and services including corporate oversight of the City's drinking water distribution systems. The Chief Administration Officer (CAO) is the most senior staff member with overall responsibility for the management of the City and reports directly to Council. The water distribution systems are operated within the Public Works and Community Services Department which is headed by the Director of Public Works and Community Services who in turn, reports to the CAO and also directly to Council with respect to the water distribution systems. The organizational structure is shown in Appendix C.

Roles, Responsibilities & Authorities

In general, Thorold City Council will fulfill the roles, responsibilities and authorities of the Owner of the Thorold Drinking water distribution systems. The operation of the City's water distribution systems was delegated by City Council to City staff. Council will be kept apprised of the water distribution system operations by the Chief Administration Officer who will normally seek Council decisions on significant matters related to the City's water distribution systems. In addition, the daily administration of the City's Drinking Water QMS, including acting on behalf of the Owner for minor changes to the QMS, is delegated to the Water & Wastewater Compliance Supervisor.

The Director of Public Works and Community Services will keep the operational structure, respective roles, responsibilities, and authorities current. The QMS

representative (Water & Wastewater Compliance Supervisor) will communicate this information to the Owner and City staff as appropriate and update information as required or needed. The Roles/Responsibilities of each position are provided in Appendix D.

10 Competencies

The required competencies of personnel with responsibilities that directly affect the drinking water distribution are provided in Appendix E.

These competency requirements are ensured by the following:

- All employees that directly impact the day to day operation and maintenance of the drinking water systems must provide evidence of certification and other competency requirements noted in Appendix E. All operator certificates must be posted at the City of Thorold Public Works Building on Beaverdams Road.
- All employees that directly impact the day to day operation and maintenance of the drinking water systems must undergo training under the Water and Wastewater Compliance Supervisor, including a review of the DWS Operations and Maintenance Procedural Manual, Emergency Response Plan, and DWQMS Operational Plan and related procedures as needed.
- All employees must receive training that meets or exceeds the requirements of Reg. 128/04 and Reg. 170/03. All licensed operators must complete the mandatory training course provided by the Ministry of Environment and Climate Change in order to ensure licenses are valid and that operators are aware of how their duties directly affect safe drinking water.

All training records and subsequent proof are kept and maintained at the City of Thorold Public Works Building.

Also a current list of personnel, who hold an operator's licence along with their respective designations, is provided in the *Water Distribution Systems Operation & Maintenance Procedural Manual, Section E-5*.

11 Personnel Coverage

Manager of Public Works is the primary Overall Responsible Operator (ORO) and the Water and Wastewater Compliance Supervisor is the designated back-up ORO. The water department is staffed Monday through Friday during regular business hours which are from 7:30 am to 4:00 pm. During this period the ORO and the back-up ORO are available and can be contacted by the City of Thorold main switchboard.

During non-business hours (evenings, nights, weekends, holidays) the on-call Supervisor will contact the ORO or back-up ORO if necessary. The 24/7 personnel coverage procedure is provided in the *Water Distribution Systems Operation & Maintenance Procedural Manual, Section E-8*.

In the event of a strike, non-union certified personnel, Water & Wastewater Compliance Supervisor, or other subcontracted external certified operators will perform day-to-day operations and maintenance.

12 Communication

Reporting to the Owner

The QMS Representative and / or the Director of Public Works and Community Services shall communicate with the Owner (Mayor and Council) as follows:

- Ensure that the Mayor and City Council are kept informed through the C.A.O of the latest developments related to the QMS through verbal and/or written reports to Council as deemed to be necessary by Top Management.

Reporting to Council will be recorded within the Council meeting minutes which will be available at the City Clerk's Office. Copies of written reports to Council will also be kept at the Thorold Public Works Building.

Operating Authority Personnel

Communications with City staff (Operating Authority Personnel) will be undertaken by the QMS Representative and include the following:

- Employee training sessions to review the Operations Plan and QMS procedures as part of the process of implementing and managing the QMS.
- A copy of the Operational Plan and QMS procedures will be made available to staff with electronic access in the QMS folder on the City's internal computer network.
- Hard copies of the most current version of the Operational Plan will also be available at the City of Thorold's Public Works Building. Copies can be obtained upon request.
- Updates and changes to the QMS and the OP will be done by email and/or verbally to staff by the QMS Representative as required.
- Employees hired after implementation of the QMS shall be introduced to the QMS during regular operator training sessions.

Public

The QMS Representative will ensure that the Operational Plan, except for sections deemed to be confidential by the QMS Representative, will be made available at both the City of Thorold's Public Works Building and City Hall upon request. Information about Drinking Water Quality and the QMS can also be found on the City's website:

www.thorold.ca

Suppliers and Contractors

Written notice of the QMS and OP will be issued by the QMS Representative to suppliers as deemed to be necessary by the QMS Representative. In such cases the suppliers will be directed to the above-noted “public” locations to access the OP.

13 Essential Suppliers and Services

Where applicable, supplies must meet all regulations and AWWA and other standards for safe drinking water. Supplies will be verified against the order requisition when received. Laboratories to be used for drinking water tests shall be licensed in accordance with applicable regulations.

A contact list of essential suppliers and contractors and the materials and services they provide to the City have been developed and are included in the *City of Thorold Drinking Water System Emergency Response Plan, Appendix 2*. All contractors and suppliers shall review the City’s QMS policy and sign the acknowledgment form (E-114) located in Appendix E of the O&M Manual.

Procurement of these supplies and services will normally be done in accordance with the City’s standard procurement policies. Where possible and financially feasible, standing agreements may be arranged to ensure timely delivery of supplies and services. In addition, the City will procure and store essential materials as determined from time to time by the Water & Wastewater Supervisor and Manager of Public Works.

14 Review and Provision of Infrastructure

The procedure for the annual review of the drinking water infrastructure can be located in the *Water Distribution Systems Operation & Maintenance Procedural Manual, Section E-1*. An annual meeting will be held by some or all members of Top Management to review the results of the summary reports prepared under procedure E-1 and assess the infrastructure needs.

15 Infrastructure Maintenance, Rehabilitation and Renewal

In general, the maintenance of the water distribution systems will be done in accordance with the procedures set out in the *Water Distribution Systems Operation and Maintenance Procedural Manual*.

The reports required through the procedure outlined in the *Water Distribution Systems Operation & Maintenance Procedural Manual - Section E-1*, serve to monitor the effectiveness of the ongoing maintenance programs. These reports will also form the basis for identifying infrastructure deficiencies and renewal requirements. These deficiencies will be reviewed by Top Management each year to identify rehabilitation and renewal projects and/or adjustments to maintenance programs. Recommendations to the Owner will be made through the standard reporting process to City Council.

Watermain and equipment replacement and unplanned maintenance will be done as needed during the year. All modifications, replacements, and watermain extensions shall comply with the City's Drinking Water Works Permit and meet the requirements specified in the Ministry of Environment and Climate Change, Safe Drinking Water Branch.

The procedure for reviewing, authorizing and documenting alterations to the drinking water system is located in the *Water Distribution Systems Operation & Maintenance Procedural Manual, Section E-12*. The storage location for associated forms and drawings are identified in the aforementioned procedure.

16 Sampling, Testing and Monitoring

The sampling, testing and monitoring of the water distribution systems are undertaken according to the procedures set out in the *Water Distribution Systems Operation and Maintenance Procedurals Manual, Section A*.

The parameters and their respective procedures for sampling, testing, and monitoring are identified in the table below. The test locations are listed in the *Water Distribution Systems Operation & Maintenance Procedural Manual, Appendix A100*.

Activity	Procedure Name	Records Location
Chlorine residual testing	A-1. Chlorine Residuals	Chlorine Residual Binder, H:Drive>Water Distribution System
Microbiological sampling	A-2. Microbiological Samples (Weekly)	System Binder
Trihalomethane sampling	A-3. Trihalomethane Samples (Quarterly)	System Binder
Haloacetic Acids sampling	A-3. Haloacetic Acids Samples (Quarterly)	System Binder
Lead sampling (As per Reg. 170/03)	A-4. Lead sampling (As per Reg. 170/03)	System Binder

The sampling, testing and monitoring records are kept in the respective binders, as noted in the table, at the Thorold Public Works Building.

Reporting of system testing and sampling is completed in accordance with the procedural methods outlined in the *Water Distribution Systems Operation & Maintenance Procedural Manual, Sections A-5, A-7 and A-8*. Sampling forms can be found in the drinking water sampling forms binder. Reporting results to surrounding municipalities and the Region of Niagara (owner of the upstream transmission system) is completed in accordance with the legislative requirements under the *Safe Drinking Water Act, 2002*.

Procedures for monitoring, testing and sampling in the upstream water supply and transmission systems are available through the Regional Municipality of Niagara.

17 Measurement and Recording Equipment Calibration & Maintenance

The procedures and frequency for the water testing equipment calibration and maintenance are documented in the *Water Distribution Systems Operation & Maintenance Procedural Manual, Section A-7, A-9 and A-10*. The storage location of the results of the calibration is identified in the aforementioned procedure.

18 Emergency Management

Emergency situations that may arise in Thorold's Drinking Water Distribution Systems are defined as events that would cause an impact or service interruption to the water distribution system that is above and beyond the normal operations and the Standard Operating Procedures (SOPs) set out in the *Water Distribution Systems Operations and Maintenance Procedures Manual*.

These events, the response and recovery procedures, communication protocol, the roles and responsibilities of staff and Council, emergency contacts and training and testing are described in the document entitled: "*City of Thorold, Water Distribution System Emergency Response Plan*". This plan is **confidential** as it contains sensitive information regarding the City's water distribution systems. A copy of this plan is kept at the City of Thorold Public Works Building and is available only to relevant staff.

In general, if a problem occurs during working hours or after hours, the caller/customer can contact the City by calling the main telephone number (switchboard) and follow the prompt. The on-call staff will respond to the problem.

The City of Thorold's water department is required to review all procedures annually, including procedures dealing with emergency situations according to the *Water Distribution Operational Procedural Manual, Sections E-1*.

19 Internal Audit

All sections of the DWQMS are subject to an internal audit at least once every twelve months. Review will be in accordance with the *Water Distribution Systems Operation & Maintenance Procedural Manual, Sections E-10 (Internal Audit Procedure) and E-15 (Corrective and Preventive Action Procedure)*

20 Management Review

A management review will be completed annually with Top Management including the QMS Representative to evaluate the effectiveness, sustainability, and adequacy of the

QMS. The procedures for the review are provided in the *Water Distribution Systems Operation & Maintenance Procedural Manual, Sections E-11*.

21 Continual Improvement

The City of Thorold shall strive to continually improve the effectiveness of its QMS by undertaking corrective actions identified through annual audits, staff suggestions, operations and maintenance reports, consideration of best practices and management reviews.

The QMS Representative will be responsible for developing and implementing the resulting changes to the QMS.

APPENDIX A

PROCESS FLOW CHART

FIGURE 1: THOROLD (DECEW) WATER DISTRIBUTION SYSTEM

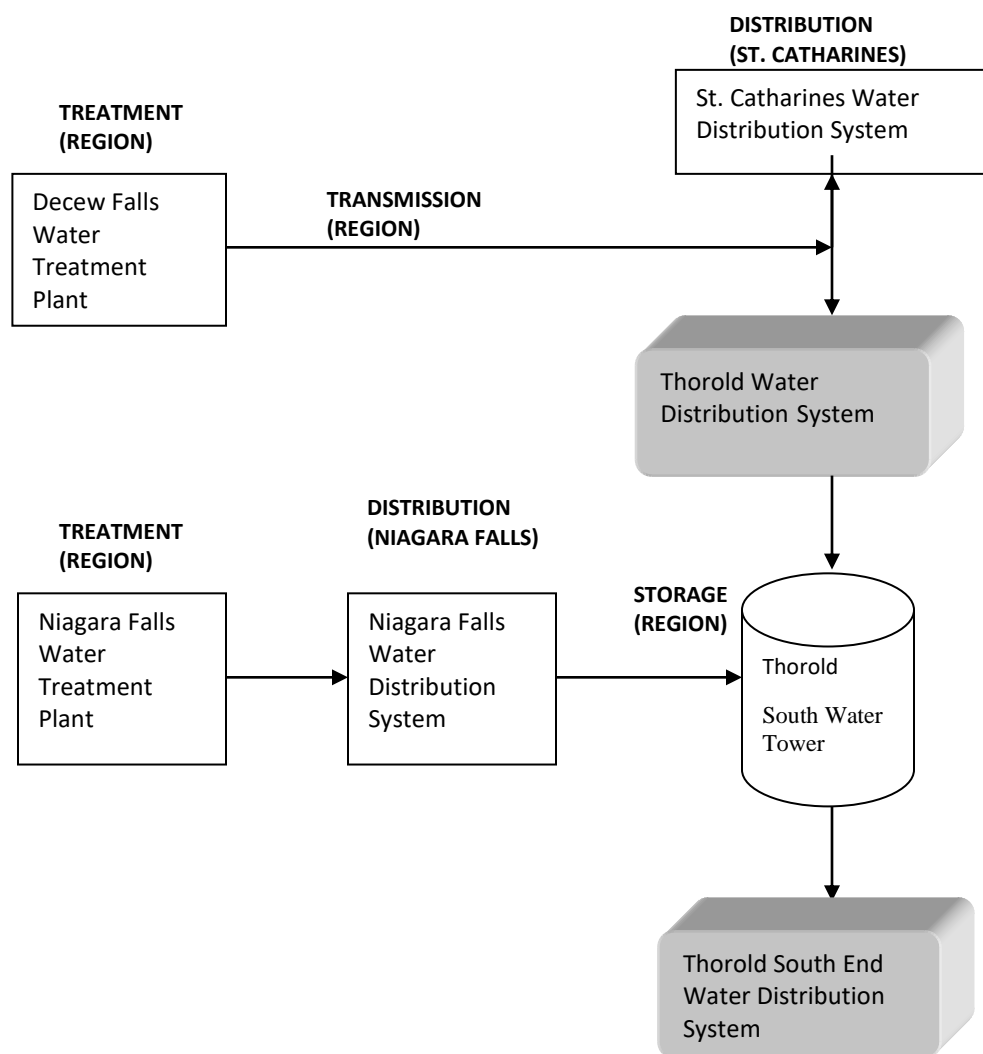


FIGURE 2: THOROLD (PORT ROBINSON) DRINKING WATER DISTRIBUTION SYSTEM

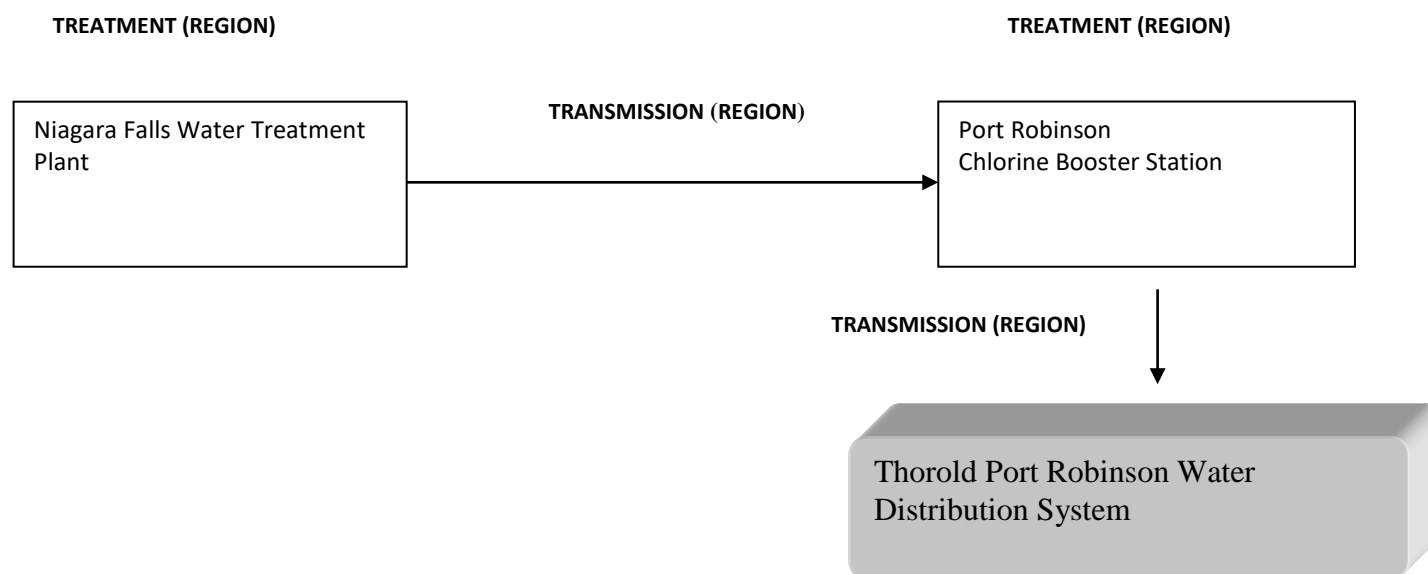
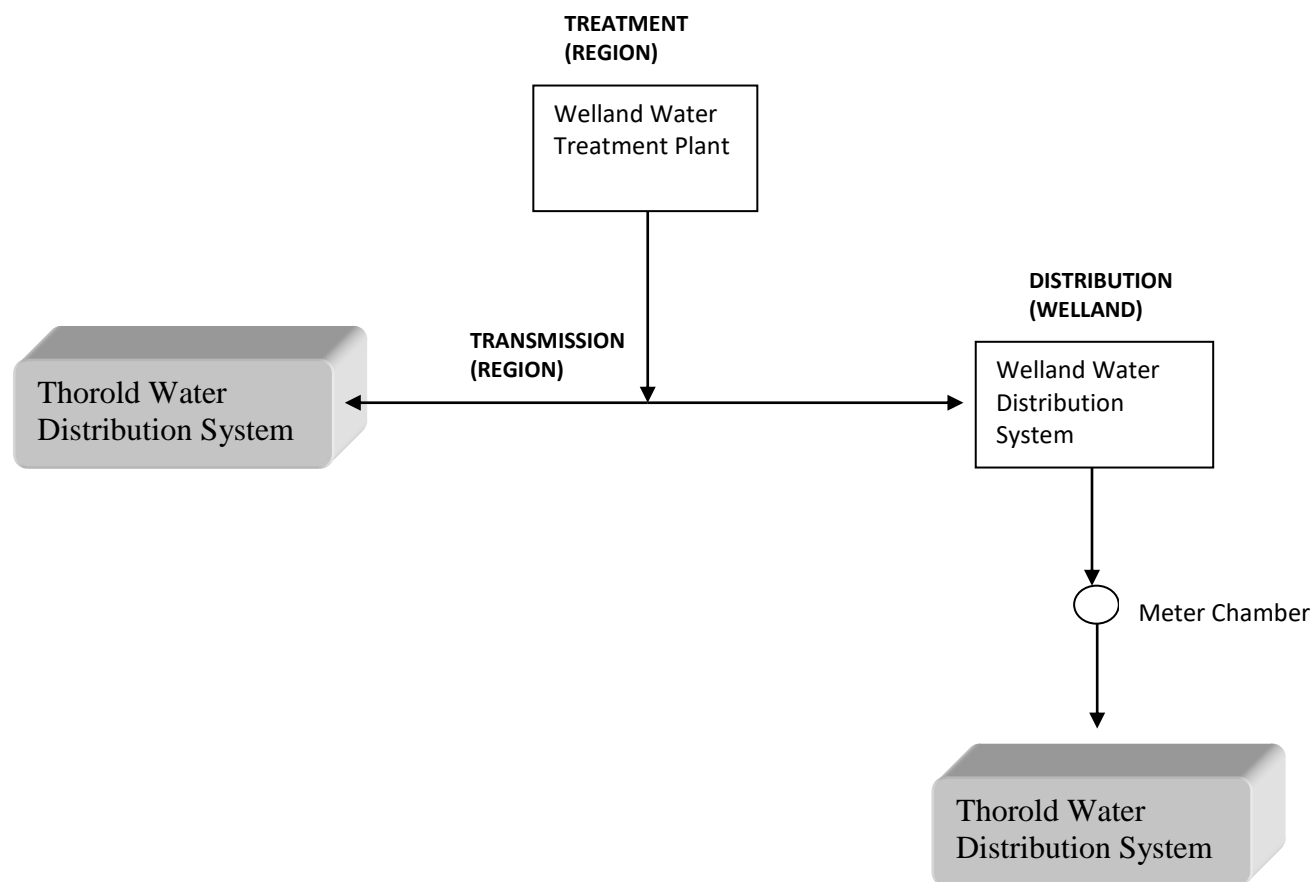


FIGURE 3: THOROLD (SOUTH END) DRINKING WATER DISTRIBUTION SYSTEM

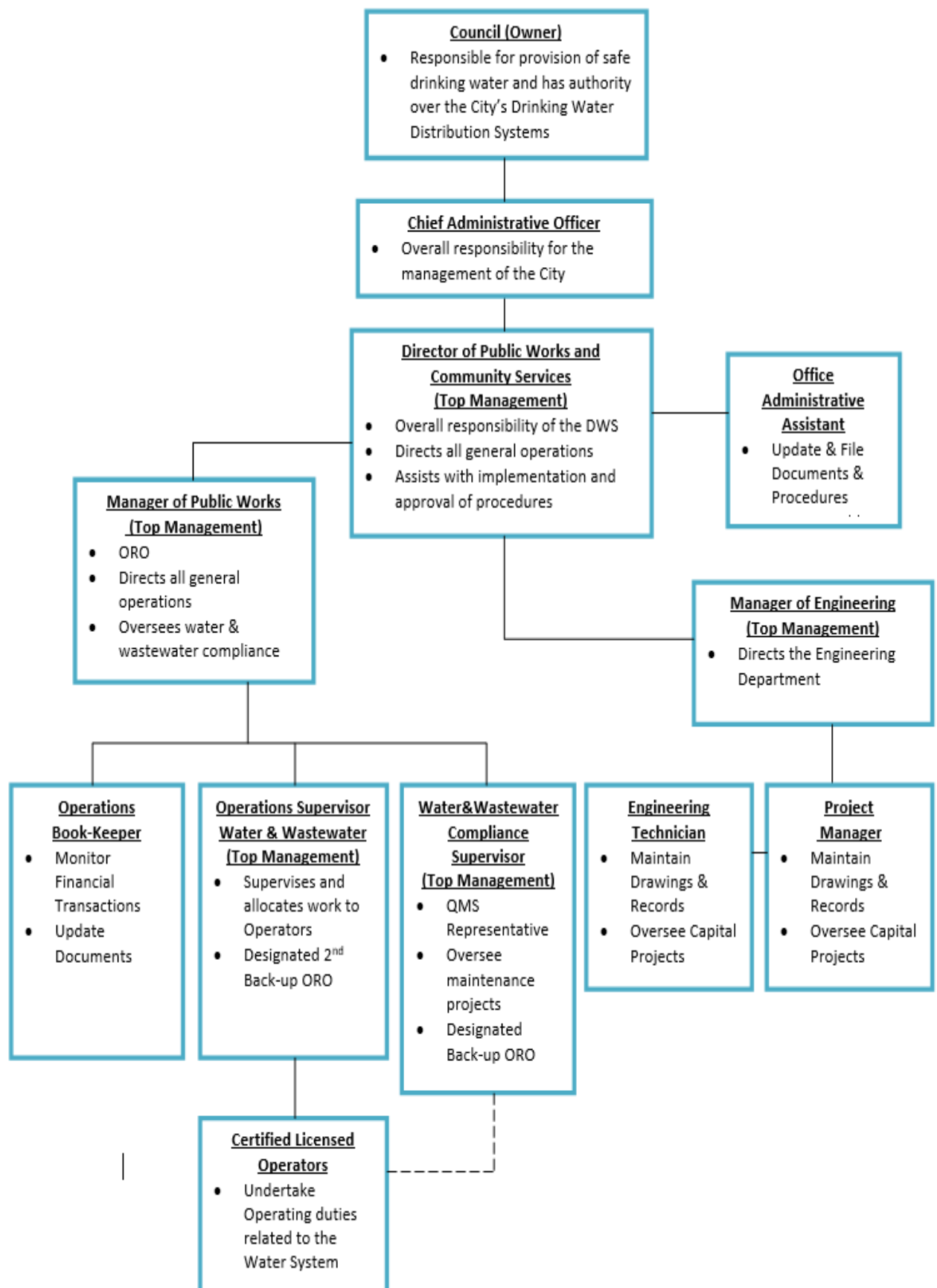


APPENDIX B

RISK OUTCOMES

APPENDIX C

ORGANIZATION STRUCTURE



APPENDIX D

ROLES, RESPONSIBILITIES AND AUTHORITIES

Appendix D – Operational Roles, Responsibilities, and Authorities

Owner – Mayor & Council	
Roles and Responsibilities	Authorities
<ul style="list-style-type: none">-Represents the Owner for the purposes of the QMS.-Complete oversight of the entire drinking water distribution system.-Ultimate responsibility for the provision of safe drinking water.-Ensure that adequate resources are allocated to achieve compliance with current regulations and legislation.	<ul style="list-style-type: none">-Financial, administrative authority related to the distribution of safe drinking water.

Chief Administration Officer	
Roles and Responsibilities	Authorities
<ul style="list-style-type: none">-Has the overall responsibility for the management of the City-Complete oversight of the entire drinking water distribution system.-Provide and/or obtain resources for the QMS and necessary infrastructure and resources to operate and maintain the drinking water system safely and effectively.- Communication with mayor and council regarding the QMS and the drinking water distribution system.-Preparation of budget and planning materials.-Ensure that adequate resources are allocated to achieve compliance with current regulations and legislation.	<ul style="list-style-type: none">-Financial, administrative authority related to the distribution of safe drinking water.

Director of Public Works and Community Services – Top Management

Roles and Responsibilities	Authorities
<ul style="list-style-type: none"> -Included in Top Management for the purposes of the QMS. -Complete oversight of the entire drinking water distribution system and QMS. -Recommends resources for the QMS and necessary infrastructure and resources to operate and maintain the drinking water system safely and effectively. -Ensure the system is operated in accordance with all applicable legislation and regulations. -Participate in management reviews of the QMS. -Preparation of budget and planning materials. -Works on annual assessments drinking water distribution system performance and maintenance. -Recommendation of system improvements. -Management review of Quality Management System. 	<ul style="list-style-type: none"> -Staffing within the guidelines of the City and any in-force collective agreements. -Oversight of activity/program scheduling within the department. -Oversight of adverse water quality incidents and responses. -Oversight of staff training.

Water & Wastewater Compliance Supervisor – Top Management

Roles and Responsibilities	Authorities
<ul style="list-style-type: none"> - Included in Top Management for the purposes of the QMS. -Designated Backup Overall Responsible Operator - Responsibilities of the QMS Representative as outlined in section 4 of the Operational Plan. -Maintains procedures for the Water Distribution Operation and Maintenance Procedures Manual. -Provide and/or obtain resources for the QMS and necessary infrastructure and resources to operate and maintain the drinking water system safely and effectively. -Ensure the system is operated in accordance with all applicable legislation and regulations. -Acts on and reports any incidents of noncompliance or non-conformance. - Lead for undertaking management review of QMS. - Develop procedures and processes for assuring/maintaining water quality. -Emergency response planning and training. - Communicates with Director of Public Works and Community Services and other staff on QMS 	<ul style="list-style-type: none"> - Makes changes/updates to the QMS. - Responses to adverse water quality incidents, MOE inspection reports and QMS non-conformance. -Makes changes/updates to operational procedures.

matters and prepares reports to Council. -Management review of Quality Management System.	
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Manager of Public Works – Top Management

Roles and Responsibilities	Authorities
<ul style="list-style-type: none"> - Included in Top Management for the purposes of the QMS. Overall Responsible Operator (ORO) - Back-up for the QMS Representative and the responsibilities of the QMS Representative as outlined in section 4 of the Operational Plan. -Oversight of the daily operations and maintenance of the water system. -Provide and/or obtain resources to operate and maintain the drinking water system safely and effectively. -Ensure the system is operated in accordance with all applicable legislation and regulations. -Ongoing liaison with the QMS Representative to ensure that reports of noncompliance or non-conformance incidents are addressed. - Management review of Quality Management System - Develop procedures and processes for assuring/maintaining water quality. -Emergency response planning and training. - Communicates with Director of Public Works and Community Services and other staff on QMS matters and prepares reports to Council. 	<ul style="list-style-type: none"> -Directs the daily operations and maintenance activities of the water distribution system. -Implements actions to address non compliance with applicable regulations and emergency situations.

Manager of Engineering – Top Management

Roles and Responsibilities	Authorities
<ul style="list-style-type: none"> - Oversee day to day activities and responsibilities of the Engineering Department. (Capital Infrastructure Replacement, New Development approvals, etc.) - Management review of Quality Management System. 	<ul style="list-style-type: none"> -Direct and oversees day to day activities in the Engineering Department. - Directs Engineering Technicians as well as external contractors and consultants.

Operations Supervisor Water & Wastewater – Top Management

Roles and Responsibilities	Authorities
<ul style="list-style-type: none">-Schedule the day to day activities relating to the maintenance of the water drinking water distribution system.-Communicates with Manger of Public Works/QMS Representative/Office Assistants with day to day activities.- Responds to emergencies.- Management review of Quality Management System .	<ul style="list-style-type: none">-Direct operators in day to day operation and maintenance of water drinking water distribution system.-Order supplies needed for drinking water distribution system operation and maintenance.- Directs external contractors.

Office Administrative Assistant

Responsibilities	Authorities
<ul style="list-style-type: none">-Communication with Director of Public Works and Community Services/Engineering Technician/Water &Wastewater Supervisor/Water & Wastewater Compliance/Manager of Public Works.-Responds to and document public complaints.-Disperse incoming information accordingly.-Communicates to operating staff during emergencies.	<ul style="list-style-type: none">-Update and file documents and procedures.

Certified Licensed Operators

Responsibilities	Authorities
<ul style="list-style-type: none">-Undertake normal operating duties related to the water distribution system.-Testing of water quality.-Conduct regular and emergency maintenance.-Report any incidents of noncompliance.-Responds to repairs and emergencies.	<ul style="list-style-type: none">-Respond to public complaints received.-Recommend changes to QMS.

Project Manager

Responsibilities	Authorities
<ul style="list-style-type: none">-Oversee capital upgrades to the water distribution system.-Liaise with QMS Representative to ensure that	<ul style="list-style-type: none">-Makes changes and updates to engineering drawings related to the

changes to the water distribution system inventory are documented. -Maintain record drawings of new work.	water distribution system.
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Engineering Technician

Responsibilities	Authorities
-Oversee capital upgrades to the water distribution system. -Liaise with QMS Representative to ensure that changes to the water distribution system inventory are documented. -Maintain record drawings of new work.	-Makes changes and updates to engineering drawings related to the water distribution system.

Operations Book Keeper

Responsibilities	Authorities
-Communication with Director of Public Works and Community Services/Engineering Technician/Water & Wastewater Supervisor/Water & Wastewater Compliance/Manager of Public Works. -Responds to and document public complaints. -Disperse incoming information accordingly. -Communicates to operating staff during emergencies.	-Update and file documents and procedures.

APPENDIX E

COMPETENCIES

APPENDIX E: COMPETENCIES

Position	Required Competencies	Desired Competencies
Chief Administrative Officer	Knowledge of the QMS General Management	Knowledge of DWQMS and WDS
Director of Public Works and Community Services	Knowledge of the QMS General Management	Knowledge of DWQMS and WDS
Water & Wastewater Compliance Supervisor (Back up ORO) (QMS Rep)	Level 1 Water Distribution Certification Detailed knowledge of the DWQMS Knowledge of applicable regulations	Internal QMS Auditor Training Knowledge of DWQMS and WDS
Manager of Public Works (ORO & Back up QMS Rep)	Level 1 Water Distribution Certification Knowledge of the QMS Knowledge of applicable regulations	Knowledge of DWQMS and WDS
Manager of Engineering	Professional Engineer licensed by PEO Knowledge of DWQMS	Knowledge of DWQMS and WDS
Certified Technicians	Certified Engineering Technician (CET) Level 1 Water Distribution Certification	Knowledge of DWQMS and WDS
Operations Water & Wastewater Supervisor	Level 1 Water Distribution Certification/Knowledge of applicable regulations (OIC)	Knowledge of DWQMS and WDS
Certified Operators	Level 1 Water Distribution Certification Fulfill the requirements of the operator in charge (OIC)	Knowledge of DWQMS and WDS
Project Manager	Knowledge of DWQMS	Knowledge of DWQMS and WDS

Appendix B: Risk Assessment Outcomes

Note: 1. Some hazards are subjected to a Critical Control Limit (CCL) which is outlined in O.Reg. 169/03: ONTARIO DRINKING WATER QUALITY STANDARDS
2. Critical Control Limits, Equipment Reliability & Redundancy & Changes to the system were considered in the risk assessment.

Activity or Process Step	Description of Hazard	Potential Result of Hazard	Comments	Available Monitoring and Control Measures	Emergency Procedure Plan	Likelihood	Severity	Detectability	Overall Risk (Threshold of ≥ 9)	Critical Control Point (CCP)?	Critical Control Limit (If CCP)?
Water Mains	Tuberculated/Corrosion of Watermains	Bacteriological/Chemical/Physical Contamination of Water	Caused by Age, Material, Flows in Watermains	Flow Testing Program, Water Sampling (Reg. 170/03), Hydrant Flushing Program,	Follow Operation Procedural Manual Section A-5	2	2	1	5	No	N/A
	Watermain Break	Bacteriological/Chemical/Physical Contamination of Water	Caused by Low Pressure/Back-siphoning	Customer Reporting or Public Works Identification of Watermain Break,	Follow Operation Procedural Manual Section A-5, Section C-2	4	2-3	1	7-8	No	N/A
	Watermain Leak	Bacteriological/Chemical/Physical Contamination of Water	Caused by Low Pressure/Back-siphoning	Customer Reporting or Public Works Identification of Watermain Break, Leak Detection Program	Follow Operation Procedural Manual Section A-5, Section C-3	4	1	2	7	No	N/A
	Vandalism/Terrorism	Bacteriological/Chemical/Physical Contamination of Water		Customer Reporting or Public Works Identification, Water Sampling (Reg. 170/03)	Follow Operation Procedural Manual Section A-5, Section C-2 and Call Police if Necessary	1	4	2	7	No	N/A
	New Installation of Watermains	Bacteriological/Chemical/Physical Contamination of Water	Caused by Unauthorized Connections and Cross Contamination	Engineering Inspection	Follow Operation Procedural Manual Section A-5, Section D	3	1	1	5	No	N/A
	Freezing Watermain	Bacteriological/Chemical/Physical Contamination of Water	Potential for Watermain Breaks, Restricted flows	Customer Reporting or Public Works Identification.	Follow Operation Procedural Manual Section A-5, Section C-2 and Thawing/Insulating??	1	2	2	5	No	N/A

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Activity or Process Step	Description of Hazard	Potential Result of Hazard	Comments	Available Monitoring and Control Measures	Emergency Procedure Plan	Likelihood	Severity	Detectability	Overall Risk (Threshold of ≥ 9)	Critical Control Point (CCP)?	Critical Control Limit (If CCP)?
Valves	Vandalism/Unauthorized Use	Bacteriological/Chemical/Physical Contamination of Water		Customer Reporting or Public Works Identification, Water Sampling (Reg. 170/03)	Follow Operation Procedural Manual Section C-1 and Section A-5, Call Police if Necessary	1	1	3	5	No	N/A
	Limited Accessibility/Non-Locatable Valves	Bacteriological/Chemical/Physical Contamination of Water	Potential for Improper Watermain Isolation	Maintain Valve Inventory, Valve Turning Program	Follow Operation Procedural Manual Section A-5, Section C-1	1	1	3	5	No	N/A
	Valve Break/Leak	Bacteriological/Chemical/Physical Contamination of Water		Valve Turning Program	Follow Operation Procedural Manual Section A-5, Section C-1	2	2	1	5	No	N/A

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2. Critical Control Limits, Equipment Reliability & Redundancy & Changes to the system were considered in the risk assessment.

Activity or Process Step	Description of Hazard	Potential Result of Hazard	Comments	Available Monitoring and Control Measures	Emergency Procedure Plan	Likelihood	Severity	Detectability	Overall Risk (Threshold of ≥ 9)	Critical Control Point (CCP)?	Critical Control Limit (If CCP)?
Valves	Closed or Partially Opened Valves	Bacteriological/ Chemical/Physical Contamination of Water		Valve Turning Program	Follow Operation Procedural Manual Section A-5, Section C-1	1	1	3	5	No	N/A
Hydrants	Unauthorized use of Hydrant/Vandalism	Bacteriological/ Chemical/Physical Contamination of Water	Industrial or Public	Hydrant Flushing/ Inspecting/ Flow Testing Programs, Backflow Preventers Approved users are issued permits to use hydrant	Follow Operation Procedural Manual Section A-5, Section B-1	3	3	4	10	Yes	User must have Permit to take water issued by City
	Break/Structural Damage	Bacteriological/ Chemical/Physical Contamination of Water	Caused by Contractor or Vehicle Accident	Customer/Police Reporting, Public Works Identification	Follow Operation Procedural Manual Section A-5, Section B-2	2	2	1	5	No	N/A
	Inoperable Hydrants			Hydrant Flushing/ Inspecting/ Flow Testing Programs, Reporting from Fire Department	Follow Operation Procedural Manual B-1	2	2	3	7	No	N/A

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Activity or Process Step	Description of Hazard	Potential Result of Hazard	Comments	Available Monitoring and Control Measures	Emergency Procedure Plan	Likelihood	Severity	Detectability	Overall Risk (Threshold of ≥ 9)	Critical Control Point (CCP)?	Critical Control Limit (If CCP)?
Hydrants	Frozen Hydrants	Bacteriological/ Chemical/Physical Contamination of Water	Potential for Cross Contamination	Hydrant Inspecting and Reporting from Fire Department	Follow Operation Procedural Manual B-1	3	1	3	7	No	N/A
	Private Hydrants	Theft		Private System under building code, Resident complaint	Follow Operation Procedural Manual Section B-1	3	1	4	8	No	N/A
	Private Hydrants	Cross Contamination of Water	Resulting from infiltration water etc	Private System under building code, Resident complaint	Follow Operation Procedural Manual B-1	1	4	2	7	No	N/A
	Accessibility			Hydrant Inspecting and Reporting from Fire Department	Follow Operation Procedural Manual B-1	3	1	3	7	No	N/A
Services	Freezing	Bacteriological/ Chemical/Physical Contamination of Water	Potential for Service Breaks, Restricted flows	Customer Reporting	Follow Operation Procedural Manual Section A-5 Thawing/Insulating??	3	2	1	6	No	N/A
	Unauthorized Connections	Bacteriological/ Chemical/Physical Contamination of Water	Potential for Cross Contamination	Backflow Prevention Program, Water Sampling	Follow Operation Procedural Manual Section A-5	2	1	4	7	No	N/A

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Activity or Process Step	Description of Hazard	Potential Result of Hazard	Comments	Available Monitoring and Control Measures	Emergency Procedure Plan	Likelihood	Severity	Detectability	Overall Risk (Threshold of ≥ 9)	Critical Control Point (CCP)?	Critical Control Limit (If CCP)?
Services	Breaks/Leaks/Vandalism	Bacteriological/Chemical/Physical Contamination of Water	Caused by Low Pressure/Back-siphoning		Follow Operation Procedural Manual Section A-5	4	1	2	7	No	N/A
Source Water	Contamination of Source Water	Bacteriological/Chemical/Physical Contamination of Water	No Control	Monitored By Region of Niagara	See Region of Niagara Emergency Response for Water and Waste Water Procedures	1	4	1	6	No	N/A
Drinking Water	Low Chlorine Residual	Bacteriological/Chemical/Physical Contamination of Water	Caused by low chlorine, high bacteria	Adverse is 0.05mg/L, City limit is 0.2mg/L before an operator contacts their supervisor for further instruction.	Follow Operation Procedural Manual Section A-1 and A-5	2	3	5	10	Yes	No
General Operations	Sustained Extreme Temperatures (e.g. Heat Wave, deep freeze)	Inadequate Supply		Monitor: Flow monitoring from Region Data	Niagara Region's Emergency Plan Section "Water Demand" Thorold's ERP-003	1	5	1	7	No	N/A
General Operations	Extreme Weather Events (e.g., tornado, ice storm)	Inadequate Supply		Monitor: Flow monitoring from Region Data	Niagara Region's Emergency Plan Section "Water Demand" Thorold's ERP-003	1	5	1	7	No	N/A

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2. Critical Control Limits, Equipment Reliability & Redundancy & Changes to the system were considered in the risk assessment.

Activity or Process Step	Description of Hazard	Potential Result of Hazard	Comments	Available Monitoring and Control Measures	Emergency Procedure Plan	Likelihood	Severity	Detectability	Overall Risk (Threshold of ≥ 9)	Critical Control Point (CCP)?	Critical Control Limit (If CCP)?
General Operations	Cybersecurity Threats	Internal Software and Data Access		<ul style="list-style-type: none">Niagara Region's network alarmNiagara Region has internal controls to restrict external access	Niagara Region Currently working on procedures	2	5	1	8	No	N/A