

 ARNPRIOR <small>• WHERE THE RIVERS MEET •</small>	TOWN OF ARNPRIOR	Policy No.	PW-DWQMS-01
	Policy/Procedure/Document:	Quality Management System – Operational Plan	
	Originating/Responsible Department:	PW. Dept.	
	Author:	QMS Representative	
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TOWN OF ARNPRIOR WALTER E. PRENTICE WATER FILTRATION PLANT AND DISTRIBUTION SYSTEM

DRINKING WATER QUALITY MANAGEMENT STANDARD OPERATIONAL PLAN

The Corporation of the Town of Arnprior
105 Elgin Street West
Arnprior, Ontario
K7S 0A8

The Operational Plan for the Town of Arnprior became effective on the 1st of October, 2009.
Version 10 – November 9, 2016

1.0 POLICY

The Corporation of the Town of Arnprior has documented a Quality Management System (QMS) to fulfill the requirements of The Drinking Water Quality Management Standard (DWQMS).

2.0 PURPOSE

The Quality Management System was developed following the DWQMS Element 1 Plan and Do requirements.

DWQMS Element 1 – Quality Management System

PLAN – The Operational Plan shall document a Quality Management System that meets the requirements of the Standard.

DO – The Operating Authority shall establish and maintain the Quality Management System in accordance with the requirements of this Standard and the policies and procedures documented in the Operational Plan.

3.0 SCOPE

This Quality Management System applies to all levels of the Operating Authority.

4.0 RESPONSIBILITY

All levels of the Operating Authority are responsible for the establishment and maintenance of the Quality Management System.

5.0 DEFINITIONS

“Accreditation”, in the context of the municipal drinking water licensing program, is the verification by a third party accreditation body that an operating authority (OA) has a QMS in place for a specific drinking-water system that meets the requirements of the DWQMS.

“Accreditation body” means a person designated or established as an accreditation body under Part IV of the Safe Drinking Water Act, 2002 (SDWA).

“Application date” means the day on or before which the owner of a municipal drinking water system shall apply for a drinking water works permit and a municipal drinking water license under Section 33 of the Safe Drinking Water Act, 2002.

“Audit” is a systematic and documented verification process that involves objectively obtaining and evaluating documents and processes to determine whether a QMS conforms to the requirements of DWQMS. There are two types of audits:
Surveillance audit is a desktop review only, no on-site visit intended;
Re-accreditation audit includes both a desktop and an on-site audit of the Quality QMS

“Audit Frequency” is the number of times that an audit occurs per unit time (i.e. once per year).

“Audit Scope” is a description of the extent and boundaries of the audit. Scope usually describes physical locations and organizational activities that are to be covered in the audit.

“Competence” is the combination of observable and measurable knowledge, skills, and abilities which are required for a person to carry out assigned responsibilities.

“Consumer” means the drinking water end user.

“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.

“Corrective Action” means the action to eliminate the cause of a detected nonconformity of the QMS with the requirements of the DWQMS, or other undesirable situation.

“Critical Control Limit” is the point at which a Critical Control Point (CCP) response procedure is initiated.

“Critical Control Point” (CCP) is 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.

“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.

“Drinking Water Health Hazard” means, in respect of a drinking water system,

- a) a condition of the system or a condition associated with the system’s waters, including anything found in the waters,
 - i. that adversely affects, or is likely to adversely affect, the health of the users of the system,
 - ii. that deters or hinders, or is likely to deter or hinder, the prevention or suppression of disease, or
 - iii. that endangers or is likely to endanger public health,
- b) a prescribed condition of the drinking water system or,
- c) a prescribed condition associated with the system’s waters or the presence of a prescribed thing in the waters

“Drinking Water Quality Management Standard” (DWQMS) is a standard that specifies minimum requirements for the Quality Management System (QMS) of an Operating Authority (OA) for a subject system. The DWQMS is a ‘made-in-Ontario’ management system standard developed specifically by the drinking-water sector for municipal

residential drinking-water systems. Its requirements are similar to ISO-based quality management standards, but no equivalent to.

“Drinking Water System” means a system of works, excluding plumbing, that is established for the purposes of providing users of the system with drinking water and that includes,

- a) Anything used for the collection, production, treatment, storage, supply or distribution of water,
- b) Anything that relates to the management of residue from the treatment process or the management of the discharge of a substance into the natural environment from the treatment system, and
- c) A well or intake that serves as the source or entry point of raw water supply for the system.

“Emergency” is 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.

“Hazard” is a source of danger or a property that may cause drinking water to be unsafe for human consumption. The hazard may be biological, chemical, physical or radiological in nature.

“Hazardous Event” is an incident or situation that can lead to the presence of a hazard. Hazards and hazardous events can result from natural or technological causes, or from human activities.

“Monitoring” includes any checks or systems that are available to detect hazards or the potential for hazards.

“Municipal Drinking Water License” is an approval that will be issued by the Ministry of the Environment (MOE) to owners under the Safe Drinking Water Act, 2002 (SDWA) for the operation of municipal residential drinking water systems.

“Municipal Drinking Water System” means a drinking-water system or part of a drinking water system,

- a) That is owned by a municipality or by a municipal service board established under section 195 of the Municipal Act, 2001;
- b) That is owned by a corporation established under section 203 of the Municipal Act, 2001;
- c) From which a municipality obtains or will obtain water under the terms of a contract between the municipality and the owner of the system; or
- d) That is in a prescribed class.

“Municipal Residential Drinking Water System” is a large municipal residential system or a small municipal residential system as defined in O.Reg. 170/03.

“Non-conformance” is the non-fulfillment of a DWQMS requirement.

“Non-compliance” is a failure under the Safe Drinking Water Act, 2002 (SDWA), the Ontario Water Resources Act, or any regulations or instruments under these Acts which are associated with drinking water.

“Operational Authority” means, in respect of a Subject System, the person or entity that is given responsibility by the owner for the operation, management, maintenance or alteration of the Subject System.

“Operational Plan” means, in respect of a Subject System, the operational plan required by the Director’s Direction.

“Operational plans date” means the day on or before which the owner of a municipal drinking-water system shall provide a copy of all operational plans for the system to the Director under subsection 16 (2) of the Safe Drinking Water Act, 2002.

“Operational Subsystem” means a part of a Municipal Residential Drinking-water System operated by a single Operating Authority and designated by the Owner as being an Operational Subsystem.

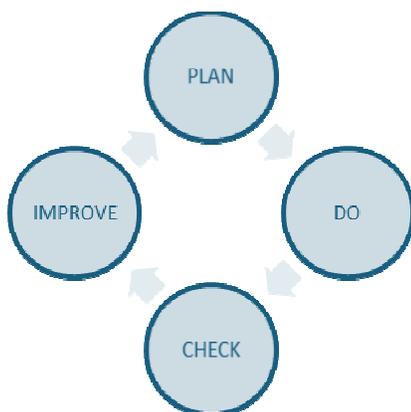
“Owner” includes, in respect of a drinking-water system, every person who is a legal or beneficial owner of all, or part of the system, but does not include the Ontario Clean Water Agency or any of its predecessors where the Agency or predecessor is registered on title as the owner of the system.

“Primary Disinfection” is a process or series of processes intended to remove or inactivate pathogens such as viruses, bacteria and protozoa in water.

“Public” is the subject system consumers and stakeholders.

“Quality Management System” (QMS) is a system to

- a) Establish policy and objectives, and to achieve those objectives; and
- b) Direct and control an organization with regard to quality.



“Record” is a document stating results achieved or providing proof of activities performed.

“Risk” is the probability of identified hazards causing harm, including the magnitude of that harm or the consequences.

“Risk Assessment” is an orderly methodology of identifying hazards or hazardous events that may affect the safety of drinking water and evaluating their significance.

“Safe Drinking Water Act, 2002” (SDWA) is a comprehensive legislative framework established by the Ontario government to protect the safety and quality of Ontario’s drinking water. The SWDA regulates the treatment and distribution of drinking water.

“Secondary Disinfection” is a process intended to provide and maintain a disinfectant residual in a drinking-water system’s distribution system.

“Subject System” means:

- a) A Municipal Residential Drinking Water System where the system is operated by one Operating Authority; or
- b) An Operational Subsystem where two or more parts of a Municipal Residential Drinking Water System are operated by different Operating Authorities.

“Supplier” is an organization or person that provides a product or service that affects drinking water quality.

“Top Management” is a person, persons or a group of people at the highest management level within an Operating Authority that makes decisions respecting the QMS and recommendations to the Owner respecting the subject system or subject systems.

Key Acronyms

ANSI	American National Standards Institute
AWWA	American Water Works Association
CCP	Critical Control Point
CICA	Canadian Institute of Chartered Accountants
CWA	Clean Water Act, 2006
DCA	Development Charges act, 1997
DWWP	Drinking Water Works Permit
DWQMS	Drinking Water Quality Management Standard
FIR	Financial Information Return
MDWLP	Municipal Drinking-Water License Program
MOE	Ministry of the Environment
NSF	Formerly “National Sanitation Foundation”, now “NSF International”
OMBI	Ontario Municipal Benchmarking Initiative
PSA	Public Sector Accounting
PSAB	Public Sector Accounting Board
PTTW	Permit to Take Water
QMS	Quality Management System
SCADA	Supervisory Control and Data Acquisition

SDWA	Safe Drinking Water Act, 2002
TCA	Tangible Capital Assets
WFP	Water Filtration Plant (water treatment facility)
WPCC	Water Pollution Control Centre (sewage treatment facility)

6.0 REFERENCES

Ontario's Drinking Water Quality Management Standard
 Implementing Quality Management: A Guide for Ontario's Drinking Water Systems
 Water Treatment Operations Manual
 Water Distribution Operations Manual
 Ontario Regulation 170/03 under Safe Drinking Water Act
 Ontario Regulation 128/04 under Safe Drinking Water Act
 Ontario Regulation 169/03 under Safe Drinking Water Act
 American Water Works Association field handbook
 American Water Works Association C651-14 (Disinfecting Water Mains)
 PIBS 4448e01 Procedure for Disinfection of Drinking Water in Ontario
 PIBS 4449e01 Tech Support Documentation for ODWS Objectives and Guidelines
 Certificate of Approval No. 5510-6CBHWE

7.0 CIRCULATION

As per DWQMS Element 12 – Communications.

8.0 PROCEDURE

The Town of Arnprior shall document the DWQMS Elements 1 – 21 as part of the Town's effort to guarantee safe, reliable drinking water to all of the supplied consumers.

8.1 Element 1 – Quality Management System

Element 1 of the DWQMS requires the Town to establish and maintain a Quality Management System that conforms to the Standard, and to document the QMS in an Operational Plan (OP). The overall intent of the OP is to ensure safe drinking water.

This document is the Town of Arnprior's Operational Plan for its drinking water QMS and consists of two parts:

- a) A summary of the requirements of the DWQMS Elements, and
- b) An appendix containing the Element policies, procedures, forms, checklists and standard operating procedures

The development and continual improvement of this OP and the associated Elements will ensure that all legislative and regulatory requirements are consistently being met and that consumers can be confident of the quality of their drinking water.

This OP is the primary tool for communicating the Town of Arnprior's QMS to the Owner, Top Management, Waterworks Staff and the Public.

8.2 Element 2 – Quality Management System Policy

Element 2 of the DWQMS requires the Town to adopt a Quality Management System Policy that shall provide the foundation of the QMS.

The Town of Arnprior is committed to providing safe drinking water to consumers. The Town pledges to continually and consistently meet or exceed all of the applicable legislative and regulatory requirements. In order to achieve the goals the Town of Arnprior shall:

- d) Manage water quality from source to customer
- e) Continually improve the drinking water system
- f) Complete the applicable water quality monitoring to ensure safe drinking water
- g) Provide consistent training to all Waterworks Staff
- h) Provide the consumers with information about their drinking water, upon request

Element 2 contains the QMS Policy.

8.3 Element 3 – Commitment and Endorsement

Element 3 of the DWQMS requires the Town to provide written endorsement of its contents by Top Management and the Owner.

The purpose of Element 3 is to prove the Owner and Top Management of the Town of Arnprior's commitment to the QMS.

Element 3 contains the Commitment and Endorsement Policy.

8.4 Element 4 – QMS Representative

Element 4 of the DWQMS requires the OP to identify a Quality Management System Representative and Implementation Lead, as well as, an Alternate.

The Town of Arnprior has designated the following individuals that shall complete the duties of the QMS Representative and Implementation Lead, irrespective of other responsibilities:

QMS Representative and Implementation Lead

Department: Public Works
Position: Environmental Engineering Officer

Alternate

Department: Public Works
Position: Civil Engineering Officer

The QMS Representative and Implementation Lead shall be responsible for the following:

- a) administering the QMS and ensuring that processes, policies and procedures needed for the QMS are established and maintained,

- b) reporting to Top Management on the performance and status of the QMS as well as the potential need for improvement,
- c) ensuring that current versions of QMS documents are being used at all times,
- d) ensuring that personnel are aware of all applicable legislative and regulatory requirements that pertain to their duties for providing safe drinking water, and
- e) promoting awareness of the QMS throughout the Operating Authority.

Element 4 contains the Appointment of a QMS Representative Policy.

8.5 Element 5 – Document and Records Control

Element 5 of the DWQMS requires the OP to develop a procedure for document and records control to ensure that all documents and records are kept current, legible, readily identifiable, retrievable, stored appropriately, protected, retained and disposed of properly.

The Town of Arnprior has a procedure in place called Document and Records Control that describes how documents and records are kept current, legible, retrievable, protected, stored and disposed of.

Element 5 contains a procedure for document and records control.

8.6 Element 6 – Drinking Water System

Element 6 of the DWQMS requires the OP to document the current drinking water system. Element 6 includes a discussion of the following information:

- a) a description of the system including all treatment processes and distribution system components
 - b) the name of the Owner and Operating Authority
 - c) a process flow chart
 - d) a description of the water source, including:
 - i) general characteristics of the raw water supply
 - ii) common event-driven fluctuations and
 - iii) any resulting operational challenges and threats
 - e) a description of any critical upstream or downstream processes relied upon to ensure the provision of safe drinking water.
- The Arnprior drinking water system is NOT an operational subsystem
 - The Arnprior drinking water system is NOT connected to one or more other drinking-water systems.

Element 6 also contains a Process Flow Diagram for the water treatment plant, a detailed description of the Water Filtration Plant process, and a map of the Town of Arnprior distribution system.

8.7 Element 7– Risk Assessment

Element 7 of the DWQMS requires the OP to document a risk assessment process that:

- a) identifies potential hazardous events,
- b) assesses the risk associated with potential events,
- c) ranks the events according to the associated risk,
- d) identifies control measures
- e) identifies critical control points,
- f) a method to verify the validity of the assumed risks and events,
- g) considers the reliability and redundancy of equipment, and
- h) ensures that a risk assessment is conducted at least once every thirty-six months.

The Town of Arnprior has established, implemented and maintains a risk assessment and risk assessment outcomes procedure to determine potential hazards and critical control points that exists within the subject system. The purpose of the procedure is to define the method used to assess and rank risks to the drinking water system and identify critical control points. In general, the procedure describes how to:

- identify and rank potential hazards to the drinking water system
- identify control measures to address hazards
- identify Critical Control Point (CCPs) and associated work instructions

The Town shall perform a risk assessment that is consistent with the documented process outlined in the OP. Top Management annually reviews the validity of the process as part of Management Review (Element 20).

Element 7/8 (combined) contains a system procedure for a risk assessment program.

8.8 Element 8 – Risk Assessment Outcomes

Element 8 of the DWQMS requires the OP to document:

- a) the identified potential hazardous events,
- b) the assessed risks associated with potential events,
- c) the ranked events according to the associated risk,
- d) the identified control measures,
- e) the identified critical control points and their critical control limits,
- f) procedures and/or processes to monitor the critical control limits,
- g) procedures to respond to deviations from the critical control limits, and
- h) procedures for reporting and recording deviations from the critical control limits.

The Town of Arnprior's risk assessment team conducts a risk assessment for the Town's drinking water system once every 36 months. The risk assessment outcomes are recorded and communicated to Top Management as part of the Management Review (Element 20).

Element 7/8 (combined) contains a system procedure for a risk assessment program.

8.9 Element 9 – Organizational Structure, Roles, Responsibilities and Authorities

Element 9 of the DWQMS requires that the OP describe the organizational structure of the Operating Authority and include the roles, responsibilities and authorities.

The Town of Arnprior has established an organizational flow chart which is included in Element 9.

8.10 Element 10 – Competencies

Element 10 of the DWQMS requires the OP to document the competencies of the Town's employees that are responsible for performing duties directly affecting the safety of the drinking water. Also ensure that Waterworks Staff are aware of the relevance of their duties and how they affect the safety of drinking water.

The Town of Arnprior's Water Filtration Plant is a Class 3 Treatment Facility and a Class 1 Distribution Facility.

Waterworks Staff must be a certified operator or an Operator-In-Training.

Operators are required to have skills and knowledge in the following areas:

Treatment Plant Operators

- Water borne diseases, pathogens and other bacteria related to water
- Water treatment processes
- Legislation and regulations pertaining to safe drinking water
- Importance of following policies and procedures relating to safe drinking water
- Performing lab analysis and interpretation of results
- Operation of a water treatment plant
- Use of SCADA
- Able to handle emergency situations
- Adjustment of chemical feed rates
- Safe practices for handling hazardous chemicals
- Conducting filter maintenance and repair
- Repairs and maintenance to pumps and equipment
- Assume the position of Operator-In-Charge (OIC) or temporary Overall-Responsible-Operator (ORO) when designated and only if properly certified.

Waterworks Supervisor (Operator)

- Duties as listed above
- Discipline leader for other water treatment operators
- Distributes work orders
- Overall Responsible Operator (Treatment)

Distribution Operator

- Knowledge of Town's water distribution system
- Secondary disinfection
- Legislation and regulations pertaining to safe drinking water
- Repairing leaks safely and following regulatory requirements for disinfection of new and repaired watermains
- Valve maintenance and repair
- Hydrant maintenance and repair

Public Works Supervisor

- Duties as listed above
- Discipline leader for other water distribution operators
- Distributes work orders
- Overall Responsible Operator (Distribution)

Top Management (Dir. of PW) is briefed on operating conditions and is provided with updates regarding upgrades to Waterworks competencies.

Element 10 contains a procedure for maintaining competency.

8.11 Element 11 – Personnel Coverage

Element 11 of the DWQMS requires the OP to document a procedure to ensure that sufficient personnel meeting the identified competencies are available for duties that directly affect drinking water quality.

The Town employees licensed operators who possess operator certification for water treatment and/or water distribution.

Water Treatment

The water treatment plant operators work daily from 8:00 am until 4:00 pm, Monday to Friday. There are normally two operators on duty at all times during the regular schedule, with the exception of vacation or sick days, etc.

The Waterworks Supervisor is the overall responsible operator (ORO) and oversees the day-to-day operation of the Water Treatment Plant. The remaining Waterworks Staff look after the daily process operations like raw and treated water testing, flow totals, pump logs, filter backwashing, chemical totals and ensures entries on daily log sheets. In addition, all operators, including the ORO assist in equipment maintenance and repair.

Any operator with a Class 2 is able to assume the Operator-In-Charge (OIC) position, when the ORO is not present. Operator-In-Training (OIT) must work under the supervisor of the ORO or a Class 2 operator.

After hours, an operator is on call in the case of an emergency. All operators are on a scheduled rotation for after hour duty. After hours and on weekends the operator on call assumes the position of the OIC and ORO. If the operator is a class OIT or Class 1, another operator at a Class 2 or above will be appointed the ORO. The operator on call is equipped with the water treatment plant page and the on-call cellular phone.

The water treatment plant is equipped with alarms on all plant process equipment, pumps and chemicals. Alarms are monitored by the SCADA system, which transfers alarms to the verbatim system. The verbatim system pages the on-call operator, or calls the cellular phone until a response is made by the operator.

The WFP is also equipped with intrusion alarms monitored by Microtech Securi-t.

Distribution System

The distribution operators work Monday to Friday from 7:30 am until 5:00 pm. After hour emergency calls are taken by the Public Works Supervisor, or others assigned.

Element 11 contains a procedure for personnel coverage.

8.12 Element 12 – Communications

Element 12 of the DWQMS requires the OP document a procedure for communications that describes how the relevant aspects of the QMS are communicated between Top Management and:

- a) the Owner,
- b) operating authority personnel,
- c) suppliers, and
- d) the public.

The Town of Arnprior's communications procedure describes the process for ensuring relevant aspects of the QMS are communicated between Top Management and the Owner, Waterworks Staff, suppliers and the public.

Element 12 contains the communication procedure.

8.13 Element 13 – Essential Supplies and Services

Element 13 requires the OP to identify the essential supplies and services needed for the delivery of safe drinking water as well as a procedure to ensure the quality of the essential supplies and services, as well as the means to ensure its procurement.

The Town requires that all supplies must meet ANSI and NSF standards and appropriate paper work must be filled out upon chemical deliveries to confirm that the product has been delivered.

At the time of delivery of an essential supply, Waterworks Staff confirm the quantities and quality of the supplies and upon completion of an essential service; Waterworks Staff inspect the work to confirm the quality.

All external laboratories must be accredited to test for the parameters in the samples that are submitted to the lab.

The Waterworks Supervisor retains the master list of essential supplies and services. In addition, a copy of the master list was provided to the QMS Representative and Implementation Lead to include the list in the OP. Any changes to the master list are communicated by the Waterworks Supervisor to the QMS Representative.

The essential supplies and services procedure describes the process for identifying essential supplies and services, and ensuring quality requirements and procurement methods are established and communicated.

Element 13 contains a procedure for essential supplies and services.

8.14 Element 14 – Review and Provision of Infrastructure

Element 14 requires the OP to document a procedure for the annual review of the drinking water infrastructure.

The Town must review the adequacy of the infrastructure to operate and maintain the system, to further determine the infrastructure that is in need of repair or replacement.

The outcomes of the annual review shall be communicated to the Owner through Staff reports.

The status and adequacy of the Town's drinking water infrastructure is assessed by the Waterworks Staff on an on-going basis. Resource requirements for maintaining adequacy are determined and communicated annually through the budget process.

Together, the CAO, Director of Public Works, the Waterworks Supervisor and Public Works Supervisor review the annual data that is collected by the Waterworks Staff and establish the future infrastructure needs based on population growth, intrusive testing, observations during works, break rates and aging materials.

The infrastructure review procedure describes the process for the review of the infrastructure adequacy.

Element 14 contains the procedure for infrastructure review.

8.15 Element 15 – Infrastructure Maintenance, Rehabilitation and Renewal

Element 15 requires the OP to provide a summary of the infrastructure maintenance, rehabilitation and renewal programs for the drinking water system. The summary must be kept current, communicated to the Owner and the effectiveness of the maintenance program shall be monitored.

The Town of Arnprior has implemented a preventative maintenance program for the water treatment plant (WTP). Preventive maintenance schedules and procedures for the WTP are described in the operations manual. Equipment and pumps at the WTP are regularly serviced and documented records are kept at the WTP in the equipment maintenance binder. Details of the procedures can be found in the operations manual.

Preventative maintenance on the distribution system is performed on a regular schedule as listed in the operations manual. Distribution system maintenance consists of flushing of hydrants in the spring and fall. When hydrants are flushed, the isolation valves are occasionally inspected along with hydrant markers and identification signage. This information is documented on hydrant record sheets that are located at the Public Works garage.

Rehabilitation and renewal of the drinking water supply system is performed on an as-needed basis. Capital and operational money is allocated and budgeted for each year for improvements to the system. The Director of Public Works, the Waterworks Supervisor and the PW Supervisor determine the priority areas for improvements in consultation with the operators.

In addition, consumer complaints and water quality trends are taken into consideration when the schedule for rehabilitation and renewal is being assembled.

A report detailing infrastructure maintenance, rehabilitation and renewal programs are summarized and communicated to Council, following management review through the annual QMS report.

Element 15 contains the procedure for infrastructure maintenance, rehabilitation and renewal.

8.16 Element 16 – Sampling, Testing and Monitoring

Element 16 of the DWQMS requires the OP to contain a procedure for process control that describes the sampling, testing and monitoring requirements and activities and how the results are communicated to the Owner. Any relevant upstream sampling, testing and monitoring activities must also be described.

The Town of Arnprior Waterworks department maintains procedures for performing sampling, testing and monitoring activities required under the applicable legislation and regulations. Outcomes from these activities are communicated to the Owner through

the annual and summary reports as required by O. Reg. 170/03 and the MOE issued Certificate of Approval.

The sampling, testing and monitoring procedure describes procedures for sampling, testing and monitoring performed at the waterworks.

Element 16 contains the sampling testing and monitoring procedure.

8.17 Element 17 – Measurement and Recording Equipment Calibration and Maintenance

Element 17 of the DWQMS requires the OP to document a procedure for the calibration and maintenance of measurement and recording equipment.

The Waterworks department maintains instructions and procedures for calibration and maintenance of measurement and recording equipment in the Water Filtration Plant operations manual and the Water Distribution operations manual. Calibration and maintenance is performed either in house or through an external manufacturer or supplier (as per Element 9 – Essential Supplies and Services), in accordance with relevant legislative, regulatory and manufacturers specifications.

Element 17 contains a Procedure for Measurement and Recording Equipment Calibration and Maintenance.

8.18 Element 18 – Emergency Management

Element 18 of the DWQMS requires the OP to document a procedure to maintain a state of emergency preparedness.

The Town of Arnprior, through the QMS Risk Assessment and Risk Assessment Outcomes (Elements 7 & 8) identified potential hazardous situations and service interruptions that could potentially affect the safety of drinking water. Emergency situations are listed in the emergency management procedure along with up-to-date internal and external contact lists, a description of how to respond and who is responsible during an emergency situation. This procedure also contains SOPs to further break down emergency situations and provide preventive, response and recovery measures. Furthermore, other detailed preventive, response and recovery measures are described in the Water Treatment Plant Operations Manual, the Water Distribution System Operations Manual and the Water Distribution System Contingency Plan for Emergencies.

In addition, the DWQMS emergency management procedure is also linked to the Corporation of the Town of Arnprior's Emergency Management plan, where appropriate.

Element 18 contains the emergency management procedure.

8.19 Element 19 – Internal Audits

Element 19 of the DWQMS requires the OP to document a procedure for internal audits that evaluates the conformity of the QMS requirements, identifies audit criteria, frequency, scope, methodology, record-keeping requirements, considers previous internal and external audit results and described how QMS corrective actions are identified and initiated.

The QMS Representative and Implementation Lead conduct(s) an internal audit to evaluate conformity of the QMS with the requirements of the DWQMS. The internal audit is conducted in accordance with the Procedure for Internal Audits.

The internal audit procedure describes the procedure for internal audits, frequency, scope, records, methodology, schedule and corrective action.

Element 19 contains the procedure for internal audits.

8.20 Element 20 – Management Review

Element 20 of the DWQMS requires the OP to document a procedure for management review that evaluates the continuing suitability, adequacy and effectiveness of the QMS.

The Town of Arnprior has documented a procedure for management review of the QMS. Top Management of the Operating Authority conducts a management review on an annual basis and reviews the topics such as, conformity to the QMS, corrective action, opportunities for improvement, etc., of the QMS.

The management review procedure describes the process of management review, including review items, reviewers, outcomes and documentation.

Element 20 contains the procedure for management review.

8.21 Element 21 – Continual Improvement

Element 21 of the DWQMS requires the Operating Authority to continually improve the effectiveness of its QMS through the use of corrective actions.

The Town of Arnprior has established and will maintain a QMS that will be regularly reviewed.

Through corrective action the Operating Authority will continually improve the QMS by modifying, updating and adjusting processes and procedures, where and when necessary to improve the operation of the drinking water system and provide greater consumer satisfaction.

Should improvements be made to the QMS, the OP will be amended to reflect the improvements, applicable parties will receive the updated procedures, Top Management and the Owner will be notified through staff reports and management review.

Element 21 contains the procedure for continual improvement.

9.0 ATTACHMENTS

ELEMENT	POLICY NO.	POLICY/PROCEDURE/PLAN NAME
2	PW-DWQMS-02	Quality Management System Policy
3	PW-DWQMS-03	Commitment and Endorsement Policy
4	PW-DWQMS-04	Appointment of QMS Representative Policy
5	PW-DWQMS-05	Document and Record Control Procedure
6	PW-DWQMS-06	Drinking Water System
7	PW-DWQMS-07	Risk Assessment Procedure
8	PW-DWQMS-08	Risk Assessment Outcomes Procedure
9	PW-DWQMS-09	Organizational Structures, Roles, Responsibilities, and Authorities
10	PW-DWQMS-10	Competencies Procedure
11	PW-DWQMS-11	Personnel Coverage Procedure
12	PW-DWQMS-12	Communications Procedure
13	PW-DWQMS-13	Essential Supplies and Services Procedures
14	PW-DWQMS-14	Review and Provision of Infrastructure Procedure
15	PW-DWQMS-15	Infrastructure Maintenance, Rehabilitation and Renewal Procedure
16	PW-DWQMS-16	Sampling and Testing Procedure
16	PW-DWQMS-22	Monitoring Procedure
17	PW-DWQMS-17	Measurement and Recording Equipment Calibration and Maintenance Procedure
18	PW-DWQMS-18	Emergency Management Procedure
19	PW-DWQMS-19	Internal Audits Procedure
20	PW- DWQMS-20	Management Review Procedure
21	PW-DWQMS-21	Continual Improvement Procedure

10.0 REVISION CONTROL

Revision Control Sheet

Review Date	Revisions Issued	Effective Date	Reviewed By	Revised By
Oct.28/09	Pg. 15, Element 10 include that Treatment Plant Operators are responsible for repairs and maintenance of pumps and equipment. Plus an additional bullet to describe that if certified and designated an operator may assume position of OIC or ORO. Pg. 16, Element 11, 4th paragraph revised to clearly indicate that during off-hours or weekends the on-call operator will assume position of OIC or ORO, but if on-call operator is only OIT or Class 1, another operator at a Class 2 or above will be appointed the ORO.	Oct. 28/09	JC	HG
Nov. 17/09	Element 9: Chart now includes that the Owner, Top Management and Waterworks Staff have responsibilities during emergency situations that may affect the drinking water quality Element 18: Improved description of the associated procedure and SOPs. Removed wording that the risk assessment identified emergency situations. The RA identified potential hazards.	Nov. 17/09	JC	HG
Dec 11, 2013	Edits to Format, header Element 6 – Detailed information removed and placed in individual section (Re Numbered as PW-DWQMS-06) Element 9 - Detailed information removed and placed in individual section (Re Numbered as PW-DWQMS-09) Monitoring Procedure Re Numbered as PW-DWQMS-22 (previously was 09)	Dec 11, 2013	GB	DS

Feb 3, 2014	Edits to Element 15 (addition of Appendices 15A and 15B) and subsequent changes to Appendix 5F Master List of Documents	Feb 3, 2014	GB	DS
March 26, 2014	Updates to appendix 8G	March 26, 2014	GB	DS
Dec 15, 2014	No updates to Element 1 Content. Only updates to master date of OP, in reference to updates of content in other Elements.	Dec 15, 2014	GB	DS
Dec 21, 2015	No updates to Element 1 Content. Only updates to master date of OP, in reference to updates of content in Elements 5 and 11.	Dec 21, 2015	NR	DS
December 2, 2015	Version # change (7→8) Section 8.3 Title Change (CE Technologist to Officer) Sec 9.0 – Policy name for Element 6 corrected	Dec 2, 2015	GB	DS
November 9, 2016	Added AWWA definition Added AWWA C651-14 to Section 6.0. Master version number update	Nov 9, 2016	JS	DS

	TOWN OF ARNPRIOR	Policy No.	PW-DWQMS-06
	Policy/Procedure/Document:	Drinking Water System	
	Originating/Responsible Department:	Public Works Department	
	Author:	QMS Representative	
	Approval Authority:	Owner and Top Management	
	Date of Original Procedure:	November 22, 2013	
	Date of Last Review:	October 19, 2016	
	Date of Last Edit:	December 3, 2015	

1.0 POLICY

The Corporation of the Town of Arnprior has a documented description of the current Drinking-Water System to fulfill the requirements of *The Drinking Water Quality Management Standard (DWQMS)*.

2.0 PURPOSE

The Drinking Water System Description was developed following the DWQMS Element 6 *Plan* and *Do* requirements.

DWQMS Element 6 – Drinking Water System

PLAN – The Operational Plan shall document, as applicable:

- a) For the subject system:
 - i) a description of the system including all treatment processes and distribution system components
 - ii) the name of the Owner and Operating Authority
 - iii) a process flow chart
 - iv) a description of the water source, including:
 - i. general characteristics of the raw water supply
 - ii. common event-driven fluctuations and
 - iii. any resulting operational challenges and threats
 - v) a description of any critical upstream or downstream processes relied upon to ensure the provision of safe drinking water.

DO – The Operating Authority shall ensure that the description of the drinking-water system is kept current.

3.0 SCOPE

This description is applicable to the Owner, Management Waterworks Staff, QMS Representative and Implementation Lead and alternate.

4.0 RESPONSIBILITY

As per DWQMS Element 9 – Organizational Structure, Roles, Responsibilities and Authorities.

5.0 DEFINITIONS

DWQMS – Drinking Water Quality Management Standard

Operational Plan (OP) – the documentation of the Operating Authority’s QMS, relevant to providing safe drinking water

DCR – Document Change Request

6.0 REFERENCES

DWQMS Element 6 – Ontario’s Drinking Water Quality Management Standard
Implementing Quality Management: A Guide for Ontario’s Drinking Water Systems
Ontario Regulation 128/04
Ontario Regulation 170/03
SDWA, 2002 Section 17, Clause (2)
Town of Arnprior Water and Waste Water Master Plan, Stantec (June 14, 2013)

7.0 CIRCULATION

As per DWQMS Element 12 – Communications.

8.0 PROCEDURE

8.1 Review of System Description

Policy PW-DWQMS-06 - Drinking Water Description shall be reviewed by the Water Works Supervisor and QMS representative once per calendar year to ensure that the system description is up to date and accurate.

8.2 Description of System – General

Owner:	The Corporation of the Town of Arnprior
Operating Authority:	The Corporation of the Town of Arnprior
Size (service population):	Medium (1,001 to 100,000)
Population:	8,114 (2011 Census)
Facility:	Walter E. Prentice Water Filtration Plant (WFP)

Facility Location:	71 James Street, Arnprior, ON K7S 1C9
Water Source:	Surface water
Raw Water Source:	Madawaska River
General Characteristics:	The raw water quality parameters colour, turbidity and alkalinity are relatively stable throughout the year. Raw water pH varies seasonally, and is generally the highest in the fall and lowest in the winter. The largest changes in the raw water quality occur during significant rain events, when pH decreases, and colour and turbidity increase.
Critical Upstream Processes:	Ontario Power Generating Authority hydro generating station and dam is located approximately 0.9 km upstream of the raw water intake.
Critical Downstream Processes:	<p>The confluence of the Madawaska and Ottawa Rivers is located approximately 2.0 km downstream of the raw water intake.</p> <p>The Town of Arnprior's Wastewater Pollution Control Centre (WPCC) outlet is located approximately 2.0 km downstream of the raw water intake.</p>
Operational Challenges/Threats:	<p>The formation of Trihalomethane (THM) in the distribution system. Chloramination upgrades undertaken in 2005 have consistently reduced THM levels to below the current criterion.</p> <p>Elevated concentrations of lead are measured at the tap in older homes (1950's era) during regulatory sampling. Lead concentrations are predominantly attributed to leaching from lead service lines and private (i.e. in-premise) lead-bearing plumbing, which is occurring as a result of treated water corrosiveness. The raw source water is not a significant source of lead in the distribution system. The Town has recently completed a Corrosion Control Plan (CCP) which includes recommendations for</p>

upgrades to the soda ash dosing system (to stabilize pH levels) as well as the addition of ortho-phosphate, a corrosion inhibitor. Work to implement the CCP recommendations is expected to be completed over the next 2-4 years. Timing of final completion will be dependent on grant funding availability.

Subsystem: N/A

Connected System Ownership: N/A

Potable water is provided throughout the Town through a municipal water distribution system. Raw water is taken from the Madawaska River, treated through a chemically assisted filtration process and discharged to a pipe network through high lift pumps situated at the water filtration plant. Within the distribution network, an elevated storage tank assists in providing balancing, fire flow and emergency flows.

Upgrades to the town's water filtration plant were completed in 2011. The WFP treatment capacity is rated at 10,340 m³/day (120 L/s) per the 2011 Certificate of Approval. The highest maximum daily flow rate for the previous five years occurred in 2009 and was 6,943m³/day or 67% of the available treatment capacity.

The Arnprior Water Filtration Plant currently operates three (3) identical high lift pumps; one as the Lead, and the remaining two as Standbys (Standby-1 and Standby-2). In existing conditions, the Lead pump is controlled to operate when the water level in the elevated storage tank drops to a certain set point. In the event that the elevated storage tank is out of service, Standby-1 and Standby-2 provide redundancy should the lead pump fail.

8.3 Water Treatment Processes

The water treatment process at the Arnprior WFP is accomplished through a series of Process Unit Operations. Each unit operation has a specific task in contributing to the overall treatment process and achieving the final filtered water quality. The unit operations which comprise the Arnprior WFP are identified below.

Raw Water Handling

- Raw Water Intake
- Screening
- Low Lift Pumps

Primary Chemical Feed Systems

- Coagulant Feed
- Polymer Feed

Mixing

- Flash Mixing

Coagulation/ Flocculation/Clarification

- Actiflo[®] System (Coagulation, Maturation and Settling Tanks)

- Actiflo® Residual Handling System

Actiflo Residual Settling

- Actiflo Residual Treatment System
- Actiflo Residual Polymer Feed System

Filtration

- Filtration System
- Filter Backwash Residual Handling

Disinfection

- Chlorine Feed System
- Chloramination System

Secondary Chemical Feed Systems

- Soda Ash feed / pH Control System
- Fluoride (HFS) Feed System

Treated Water Storage and Transmission

- Treated Water Clearwell
- High Lift Pumping

An in-depth description of each of the WFP processes can be found in Appendix 6A.

8.4 Distribution System

The distribution system consists of the following:

- Three high-lift pumps located at WFP
- approximately 55.5 km of distribution watermain
- approximately 316 fire hydrants
- approximately 614 valves (not including service valves or hydrant valves)
- one elevated water tower with a 2,727,000 L capacity

The approximate 60 km of distribution watermain is constructed with a combination of copper, PVC, cast iron and ductile iron of pipe with diameters ranging from 19mm to 600mm. The network predominantly consists of 150mm diameter pipe (41% of all pipes), mostly situated in the northern-central portion of the network. The larger, 400mm diameter transmission pipes are located between the Water Filtration Plant and the Elevated Storage Tank and along a major distribution route along Daniel Street. The 300mm, 250mm, 200mm, and 150mm diameter pipes act as the main feed to the entire area and are dispersed throughout the system.

8.5 Elevated Storage Tank

Emergency, balancing and fire storage is provided by an elevated water storage tank situated in the north east industrial lands. The existing elevated storage tank has a maximum capacity of 2.84 ML (625,000 l gallons) and is located at a ground elevation of 104.10 m. This elevated storage tank is fed by a 400mm diameter watermain.

9.0 ATTACHMENTS

[Appendix A –Water Filtration Plant Detailed Process Description](#)

[Appendix B - Figure 1 – Water Filtration Plant Process Flow Chart](#)

[Appendix C - Figure 2 – Distribution System Plan](#)

10.0 REVISION CONTROL

Revision Control Sheet

Review Date	Revisions Issued	Effective Date	Reviewed By	Revised By
Dec 4, 2013	Template Updates	Dec 4, 2014	GB	DS
Apr 4, 2014	Addition of Lead and CCP information to Operational challenges Added reference to appendix 6A	Dec 9, 2014	GB	DS
Dec 3, 2015	Adjusted section 8.4 numbers (hydrants, km's, etc.) Added hyperlinks to section 9.0	Dec 3, 2015	GB	DS

APPENDIX A

APPENDIX B

APPENDIX C

	TOWN OF ARNPRIOR	Policy No.	PW-DWQMS-09
	Policy/Procedure/Document:	Organizational Structures, Roles, Responsibilities, and Authorities	
	Originating/Responsible Department:	Public Works Department	
	Author:	QMS Representative	
	Approval Authority:	Owner and Top Management	
	Date of Original Procedure:	November 29, 2013	
	Date of Last Review:	October 19, 2016	
	Date of Last Edit:	December 7, 2015	

1.0 POLICY

The Corporation of the Town of Arnprior has defined the Organizational Structures, Roles, Responsibilities, and Authorities required for personnel performing duties that affect drinking water quality to fulfill the requirement of *The Drinking Water Quality Management Standard (DWQMS)*.

2.0 PURPOSE

PLAN – The Operational Plan shall:

- a) describe the organizational structure of the Operating Authority including respective roles, responsibilities and authorities,
- b) delineate corporate oversight roles, responsibilities and authorities in the case where the Operating Authority operates multiple subject systems,
- c) identify the person, persons or group of people within the management structure of the organization responsible for undertaking the Management Review,
- d) identify the person, persons or group of people, having Top Management responsibilities required by this Standard, along with their responsibilities, and
- e) identify the Owner of the subject system.

DO – The Operating Authority shall keep current the description of the organizational structure including respective roles, responsibilities and authorities, and shall communicate this information to Operating Authority personnel and the Owner.

3.0 SCOPE

This description is applicable to the Owner, Top Management, Waterworks and Public Works Garage Staff, QMS Representative and Implementation Lead and alternate.

4.0 RESPONSIBILITY

As per DWQMS Element 9 – Organizational Structure, Roles, Responsibilities and Authorities.

5.0 DEFINITIONS

N/A

6.0 REFERENCES

DWQMS Element 9 – Ontario’s Drinking Water Quality Management Standards

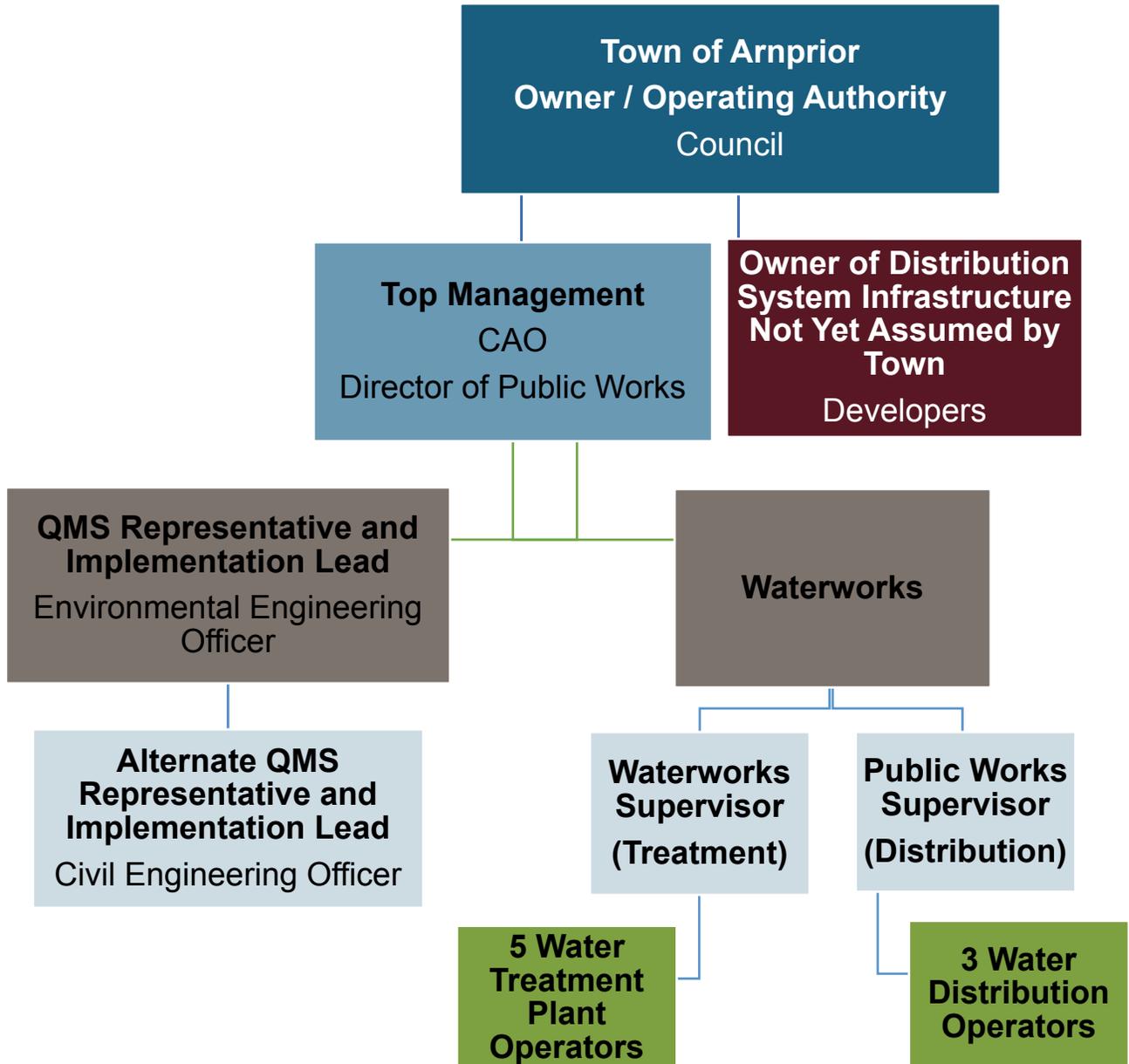
7.0 CIRCULATION

As per DWQMS Element 12 – Communications.

8.0 PROCEDURE

8.1 Specific responsibilities and authorities for positions with key roles in the Drinking water Quality management System are detailed in the various system procedures and standard operating procedures that form the Operational Plan. The flow chart and table below provides a summary of the overall roles, responsibilities and authorities related to the provision of safe drinking water in the drinking water system.

Operating Authority Flow Chart



Description of Responsibilities and Authority of QMS Personnel

ROLE/TITLE	RESPONSIBILITY	AUTHORITY
Owner	Assumes applicable responsibilities and authorities outlined in the Safe Drinking Water Act, 2002 and the DWQMS.	Assumes applicable responsibilities and authorities outlined in the Safe Drinking Water Act, 2002 and the DWQMS.
Mayor Councilors	<ul style="list-style-type: none"> • ensuring Operating Authority is accredited • commitment and endorsement of QMS • Development of financial plans • appointment of QMS Rep. and Implementation Lead • Decision making and public correspondence during an emergency situation affecting the drinking water quality 	<ul style="list-style-type: none"> • perform listed responsibilities • recommend changes or improvements to the QMS
Top Management	Ensuring the QMS is established and maintained.	
Chief Administrative Officer (CAO) Director of Public Works	<ul style="list-style-type: none"> • commitment and endorsement of QMS • completion of Management reviews • ensuring sufficient resources for the QMS • appointment of QMS Rep. and Implementation Lead • Decision making, job delegation and communication with the Owner during an emergency situation affecting the drinking water quality 	<ul style="list-style-type: none"> • Perform listed responsibilities • recommend changes or improvements to the QMS • implement improvements to the QMS • development of facility budget
Waterworks Staff	Operation of the drinking water system	
Waterworks Supervisor	<ul style="list-style-type: none"> • maintains regulatory compliance 	<ul style="list-style-type: none"> • perform listed

ROLE/TITLE	RESPONSIBILITY	AUTHORITY
(treatment)	<ul style="list-style-type: none"> • monitors water quality and demand • overall responsible operator • schedules work assignments • maintains operator licensing at plant certification • supervises operations and staff • job delegation and communication with Top Management during an emergency situation. Response and recovery during an emergency situation • ensures that each operator has up to date and proper certification 	<ul style="list-style-type: none"> responsibilities • approves and directs other staff to follow QMS • reports adverse water quality to regulatory agencies, owner, top management, QMS Rep. and public • recommend changes or improvements to the QMS •
Public Works Supervisor (distribution)	<ul style="list-style-type: none"> • maintains regulatory compliance • monitors water quality and demand • overall responsible operator • schedules work assignments • maintains certification • supervises operations and staff • job delegation and communication with Top Management during an emergency situation. Response and recovery during an emergency situation 	<ul style="list-style-type: none"> • perform listed responsibilities • approves and directs other staff to follow QMS • reports adverse water quality to regulatory agencies, owner, top management, QMS Rep. and public • recommend changes or improvements to the QMS • The Public Works Supervisor is generally listed as the Overall Responsible Operator (ORO). The responsibility may be delegated to other properly certified staff during absences.
Plant and Distribution Operators	<ul style="list-style-type: none"> • Performs operations and maintenance activities to ensure safe drinking water 	<ul style="list-style-type: none"> • Performs listed responsibilities • recommend changes or

ROLE/TITLE	RESPONSIBILITY	AUTHORITY
	<ul style="list-style-type: none"> • Report and acts upon non-conformance • Operator in-charge when designated • Follows procedures, policies, forms, checklists, sops • Files records • Attends training • Receives and communicates external complaints • Communicates to WW. Super. on regular basis • Response and recovery during an emergency situation • Distribution and WFP Operators with an appropriate level of certification may be delegated the responsibility of “Overall Responsible Operator” during extended periods of absence by the WW or PW Supervisor. 	<p>improvements to the QMS</p>
<p>QMS Representative and Implementation Lead</p>	<p>To administer the QMS to the Operating Authority</p>	
<p>Env. Eng. Officer Civil Eng. Officer (Alternate)</p>	<ul style="list-style-type: none"> • administer QMS • preparing reports to Owner (Members of Council) • ensure QMS policies and procedures are established and maintained • report status of QMS to the Owner and Top Management • ensure current versions are being used • ensure personnel are aware of all applicable requirements of the QMS • promote awareness of QMS • internal audits 	<ul style="list-style-type: none"> • implementation of improvements of QMS under the direction of Top Management • changes to the QMS • present corrective action

8.2 The Roles, responsibilities, authorities and titles for personnel shall be reviewed by the QMS Rep once per calendar year. Review of roles and responsibilities may also include input from the Town of Arnprior Human Resources Officer.

9.0 ATTACHMENTS

N/A

10.0 REVISION CONTROL

Revision Control Sheet

Review Date	Revisions Issued	Effective Date	Reviewed By	Revised By
Dec 4, 2013	Creation of Procedure in separate Template	Dec 4, 2013	GB	DS
Dec 8, 2014	QMS Rep and alternate titles amended from 'tech' to officer	Dec 8, 2014	GB	DS
Dec 7, 2015	Added requirement of operators to act as ORO during extended absences of supervisors Addition of developers to Operating Authority Flow Chart	Dec 7, 2015	GB	DS