Appendix VII

THE CORPORATION OF THE TOWN OF NIAGARA-ON-THE-LAKE

DWQMS OPERATIONAL PLAN:

NIAGARA-ON-THE-LAKE DRINKING WATER SYSTEM

(BEING A LARGE MUNICIPAL DRINKING WATER DISTRIBUTION SYSTEM, LICENSE NUMBER 069-102, ISSUE NUMBER 4) **DWS # 260001380**

AND

BEVAN HEIGHTS DRINKING WATER SYSTEM

(BEING A SMALL MUNICIPAL DRINKING WATER DISTRIBUTION SYSTEM, LICENSE NUMBER 069-101, ISSUE NUMBER 4) **DWS # 260062452**

January 2023, Revision # 9

PW-DW-OP-001-001

DWQMS OPERATIONAL PLAN

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1.0 Quality Management System

1.1 Purpose

The purpose of this Operational Plan is to document the Town of Niagara-on-the-Lake's Drinking Water Quality Management System as part of the Town's efforts to ensure that safe drinking water is supplied to all of its customers. This Operational Plan was developed in alignment with the requirements of the Ministry of the Environment's Drinking Water Quality Management Standard Version 2.0 (February 2017).

1.2 Scope

This Operational Plan applies to all drinking-water-related operations at the Town of Niagara-on-the-Lake, including both the Niagara-on-the-Lake and Bevan Heights drinking-water systems. All components of this Operational Plan are understood to apply to both of the Town's drinking-water systems, unless otherwise noted. Where a section of this Operational Plan applies to only one of the Town's drinking-water systems, the scope of the section is clearly stated.

The contents of the DWQMS Operational Plan include the following:

Part Title	Part
Operations and Maintenance Manual	Appendix I
DWQMS Risk Assessment Results for both DW Sytems	Appendix II
CCP for Low Chlorine in the Distribution System	Appendix III
Water Operations Emergency Response Plan	Appendix IV
Schedule C for the NOTL Distribution System	Appendix V
Schedule C for the Bevan Heights Distribution System	Appendix VI
DWQMS Operational Plan - Rev9 - January 2023	Appendix VII

1.3 Definitions

Accreditation Body — Independent, third-party body that has been appointed to conduct DWQMS Accreditation Audits. The Accreditation Body is authorized to make recommendations for certification of a Municipality's DWQMS. For DWQMS accreditation, the Accreditation Body has been identified as ***SAI Global***.

AWQI (Adverse Water Quality Incident) — Incident affecting drinking water quality in which one or more of the following conditions is observed:

1. A drinking water test result is obtained that exceeds any of the standards prescribed by Schedule 1, 2 or 3 of O. Reg. 169/03, other than the standard for fluoride.
2. A drinking water test result is obtained that indicates the

	presence of *Aeromonas* spp., *Pseudomonas aeruginosa*, *Staphylococcus aureus*, *Clostridium* spp. or fecal *streptococci* (Group D *streptococci*).
AWQI (Adverse Water Quality Incident) (continued)	3. A drinking water test result is obtained that indicates the presence of a pesticide not listed in Schedule 2 of O. Reg. 169/03. 4. A drinking water test result is obtained indicating that the concentration of free chlorine residual is less than 0.05 mg/L in a distribution sample.
DWQMS	Drinking Water Quality Management System
DWS	Drinking-water system.
DWS Operator	Person who conducts operational checks or who adjusts, tests or evaluates a process that controls the effectiveness or efficiency of a DWS, including the flow, pressure or quality of water within the DWS.
DWS Vendor	Supplier or service provider that provides a product or service related to the drinking water system.
Ministry of the Environment, Conservation & Parks (MECP)	Provincial Ministry that developed the DWQMS Standard and requires select Ontario municipalities & utilities to develop and implement a DWQMS as a component of the Municipal Drinking-Water Licence Program.
Operator-in-Charge (OIC)	Operator designated by the Owner or Operating Authority to perform duties as outlined in O. Reg. 128/04, s. 25 (SDWA) and as per applicable Town procedures.
Overall Responsible Operator (ORO)	Operator designated by the Owner or Operating Authority to perform duties as outlined in O. Reg. 128/04, s. 23 (SDWA) and as per applicable Town procedures.
Owner	Legal or beneficial owner of the DWS. For the Town of Niagara-on-the-Lake, the Owner is represented by the Lord Mayor and Council. The Chief Administrative Officer has been identified as an Owner Representative.
QMS	Quality Management System
Top Management	Person(s) at the highest management level within the Operating Authority that makes decisions respecting the DWQMS and recommended actions to the Owner regarding the DWS. For the Town of Niagara-on-the-Lake, Top Management has been identified as the Director of Operations and the Manager of Public Works and the Supervisor of Environmental Services.
Town	Town of Niagara-on-the-Lake

2.0 Quality Management System Policy

The Town of Niagara-on-the-Lake's DWQMS Policy applies to both the Niagara-on-the-Lake and Bevan Heights drinking water systems, and is as follows:

"The Town of Niagara-on-the-Lake owns and operates the Niagara-on-the-Lake Distribution System and the Bevan Heights Distribution System. The Town is committed to:

- **W**orking to ensure legislative compliance with the Safe Drinking Water Act and all applicable regulations;
- **A**cting quickly to resolve any issues relating to drinking-water quality;
- **T**aking all steps necessary to provide safe drinking-water to Town consumers;
- **E**stablishing open and effective communication with Town water consumers;
- **R**eviewing and continually improving its Drinking-Water Quality Management System."

The DWQMS Policy is approved and endorsed by the Owner and Top Management of the DWS as a component of this Operational Plan[1]. The DWQMS Policy is posted ***(PW-DW-VIS-001-001)*** at the Town of Niagara-on-the-Lake's Public Works Department, and will also be communicated to the public through posting on the Town's website.

3.0 Commitment and Endorsement

This Operational Plan has been reviewed and approved by Top Management and the Owner of the Town of Niagara-on-the-Lake's drinking water systems. A resolution was passed by Council endorsing the Operational Plan and its contents on September 16, 2019 as per Report to Council OPS-19-018. The signatures below further serve as endorsement of this most recent version of the DWQMS Operational Plan with the new Lord Mayor, Director of Operations and Councilors.

Gary Zalepa *Lord Mayor* *On behalf of the Owner* *(Lord Mayor & Council)*	*Rome D'Angelo* *Director of Operations* *DWS Top Management Representative*

[1] As per the acceptance of Report to Council # OPS-23-026

4.0 Quality Management System Representative

The Engineering Technologist, DWQMS has been appointed as the Quality Management System Representative for the Town of Niagara-on-the-Lake's DWQMS, and has been authorized to carry out all of the responsibilities associated with this role. One certified operator on staff in the water department has been appointed as a backup QMS Representative.

In addition to the other aspects of their role, the Engineering Technologist, DWQMS holds the following responsibilities as Quality Management System Representative:

- Ensuring that processes and procedures required for the DWQMS are established, implemented and maintained;
- Reporting to Top Management regarding DWQMS performance and any need for improvement;
- Ensuring that only current versions of documentation required by the DWQMS are in use at all times;
- Ensuring that personnel are aware of all applicable legislative and regulatory requirements that pertain to their duties in the operation of the Town of Niagara-on-the-Lake's drinking-water systems; and
- Promoting awareness of the DWQMS throughout the Operating Authority.

5.0 Document and Records Control

5.1 Document Control

A procedure has been developed that outlines document control processes for the Operating Authority. The purpose of ***Control of Documents*** *(**PW-DW-PRO-002-001** – see Appendix I)* is to provide a controlled process for the creation, modification, review, approval, distribution, retrieval and protection of DWS-related documentation at the Town of Niagara-on-the-Lake.

5.2 Records Control

A procedure has been developed that outlines record control processes for the Operating Authority. ***Control of Records*** *(**PW-DW-PRO-003-001** – see Appendix I)* specifies processes for the collection, identification, storage, maintenance, protection, retention and disposal of DWS-related records at the Town of Niagara-on-the-Lake.

The ***DWQMS Record Control Matrix*** *(**PW-DW-LM-003-001** – see Appendix I)* lists DWS records managed under this procedure. Each record profile within the Matrix lists the record name, minimum record retention time, record owner (i.e., person responsible for the record), and physical form of storage including the storage location(s). Where required by legislation and/or regulations, DWS records are made available for review by customers and/or stakeholders.

Once the indicated minimum retention time has been reached, drinking-water system records may be destroyed. Records should be disposed by the end of the calendar year in which their retention time elapses. The Town reserves the right to retain selected records of interest for periods exceeding the record's specified minimum retention time.

6.0 Drinking Water System Process Description

6.1 General

The Town of Niagara-on-the-Lake (Town) owns and operates two separate drinking water distribution systems including the Niagara-on-the-Lake drinking water system (Niagara-on-the-Lake DWS) and the Bevan Heights drinking water system (Bevan Heights DWS). The Town maintains responsibility for water distribution only. Raw water uptake, water treatment, transmission mains and treated water storage processes and infrastructure are owned and managed by Niagara Region (Region). In combination, the Niagara-on-the-Lake and Bevan Heights drinking water systems distribute treated drinking water within a service area of approximately 12,600ha. The service area is bounded by Lake Ontario, the Niagara River, the City of Niagara Falls and the City of St. Catharines as shown in the ***Town of Niagara-on-the-Lake Service Area Map*** (***PW-DW-VIS-001-002***).

Letter of Understanding

A ***Memorandum of Understanding – Water Servicing*** *(November 22, 2016)* exists between Niagara Region and the Town of Niagara-on-the-Lake. The ***Memorandum of Understanding*** documents Regional and Town responsibilities and activities that are completed to ensure the continued supply, operation and delivery of water services to Town residents and customers. The Memorandum of Understanding applies in respect of both the Niagara-on-the-Lake and Bevan Heights drinking water systems, and outlines the following:

- Ownership of Infrastructure: In examination of Region-to-Town connection points, it is understood that Niagara Region will own and operate, to and including, the first valve on any connections to any Region-owned transmission main.

- Supply Requirements: Supply requirements are outlined including quantity of water to be delivered by the Region, system pressure requirements, and operation and continued supply.
- Maintenance Requirements: Outlined requirements provide details of watermain break protocols, communication of system isolation and watermain flushing activities.
- Water Quality Requirements: Details include drinking water quality requirements, water testing requirements, and requirements for sharing of test results and adverse water quality event notifications. It is stated that drinking water quality shall meet or exceed all regulatory requirements, operational guidelines, and aesthetic objectives as detailed in the Ontario Drinking-Water Standards.
- Emergency Response Requirements: Outlined are requirements for contingencies, responsibilities, request for support and emergency response contact list availability. Plans for Emergency Response Procedures shall be shared with all parties and maintained and updated as required.

6.2 Niagara-on-the-Lake DWS

The Niagara-on-the-Lake Distribution System receives treated drinking-water from the St. Catharines (Decew) Water Treatment Plant (Decew WTP) and the Niagara Falls Water Treatment Plant (Niagara Falls WTP), both of which are Regionally-owned and operated. Treated water is conveyed to approximately 15,400 residents through approximately 200 km of Town-owned watermains.

6.2.1 Decew Water Treatment Plant & Treated Water Quality

While the Town is not responsible for water treatment processes, a brief description of the Decew WTP is included for informational purposes.

Owned and operated by the Region, the Decew WTP is a water intake and treatment facility serving the Cities of St. Catharines and Thorold and the Towns of Lincoln and Niagara-on-the-Lake, including a portion of the Niagara-on-the-Lake DWS. The facility is rated at a maximum capacity of 227 ML/day.

Lake Erie serves as the raw water source for Decew WTP operation. Raw water is drawn through a supply canal and a series of reservoirs. The intake consists of two surface intake conduits approximately 7.3 m in length, with a combined width of 7.5m. Treatment components include zebra mussel control, coagulation, flocculation, sedimentation, filtration and primary disinfection. The water travels through a high-lift pumping station before being transferred to the Region's transmission system. Two Regionally-owned water storage facilities, the Virgil Water Tower and the St. Davids Standpipe, store treated water for distribution within the Town of Niagara-on-the-Lake DWS.

Treated water leaving the Water Treatment Plants must meet or exceed all regulatory requirements. The Region monitors treated water turbidity and free chlorine residual at the WTP discharge and provides this data to the Town as required or requested.

6.2.2 Niagara Falls Water Treatment Plant & Treated Water Quality

While the Town is not responsible for water treatment processes, a brief description of the Niagara Falls WTP is included for informational purposes.

Owned and operated by the Region, the Niagara Falls WTP is a water intake and treatment facility serving the Cities of Niagara Falls and Thorold and the Town of Niagara-on-the-Lake, including a portion of the Niagara-on-the-Lake DWS and the Bevan Heights DWS. The facility is rated at a maximum capacity of 145ML/day.

The Welland River serves as the raw water source for Niagara Falls WTP operation. Raw water is introduced via a 1,200mm diameter intake pipe extending approximately 140m into the Welland River. Water treatment processes include pre-chlorination, coagulation, flocculation, sedimentation, filtration and primary disinfection. A high-lift pumping station conveys treated water from the WTP to the Niagara-on-the-Lake DWS and the Bevan Heights DWS via Regional transmission mains. The Regionally-owned St. David's Standpipe stores treated water for distribution within the Town of Niagara-on-the-Lake DWS.

Treated water leaving the Water Treatment Plants must meet or exceed all regulatory requirements. The Region monitors treated water turbidity and free chlorine residual at the WTP discharge and provides this data to the Town as required or requested.

6.2.3 Niagara-on-the-Lake DWS: Water Distribution

The Niagara-on-the-Lake DWS distributes treated drinking water to approximately 15,000 residents[2]. Distribution system infrastructure includes approximately 201 km of Town watermains ranging in size from 50mm to 300 mm; additional conveyance is provided by approximately 40 km of Regionally-owned and operated watermains ranging in size from 100 mm to 550 mm.

Approximately 70% of the Town's watermains are constructed in polyvinyl chloride (PVC) with the remaining constructed in asbestos cement, ductile iron, polyethylene (PE) and copper. Additional infrastructure includes approximately 1,410 fire hydrants and 1,383 valves, two water filling stations, and one Regionally-owned and operated

[2] Service population established as of 2011

water storage facilities. The Niagara-on-the-Lake DWS is 100% metered. The Town does not complete any drinking water treatment or rechlorination activities, and does not provide drinking water to any downstream municipalities.

Connections to and from the Niagara-on-the-Lake DWS are summarized as follows:

Table 6-1: Niagara-on-the-Lake Distribution System Connections

From	To
Decew WTP (Regional) (via trunk watermains Glendale Avenue)	Niagara-on-the-Lake DWS (Town-Owned)
Niagara Falls WTP (Regional) (Four Mile Creek Road, and also via Niagara Falls Distribution System on Concession 6 via Mewburn Road)	Niagara-on-the-Lake DWS (Town-Owned)

6.2.4 Common Event-Driven Fluctuations

As the Town of Niagara-on-the-Lake is not responsible for water treatment, the Town's operations are not directly impacted by fluctuations in raw water quality. Impacts of event-driven fluctuations (i.e., storms) are managed by the Region at the treatment stage and do not typically affect the Town's operation of the drinking-water distribution system.

Water volume has not been an issue in the past for the Niagara-on-the-Lake DWS. Lake Erie serves as the raw water source for the Decew WTP, and lake volumes do not fluctuate to a degree that would compromise WTP operations. Similarly, volumes at the Welland River do not fluctuate to a degree that would compromise Niagara Falls WTP operations. One Regionally-owned and operated treated water storage facility (Virgil Water Tower) provide a limited backup supply of treated water for the distribution system. However, water restrictions may be enforced on occasion to compensate for limitations in flow capacities; these limitations are observed in Regional infrastructure. Treated water supply to storage facilities is a Regional responsibility, but water demand may dictate the need for restrictions (i.e., in a drought). Water restrictions are typically only required during peak seasons, when treated water demand is at its highest. The Town of Niagara-on-the-Lake's By-Law #1943-88 is in place to enact water restrictions during situations of heightened demand.

6.2.5 Operational Challenges

A number of pressure-reducing valves (PRVs) (approximately 40) are installed throughout the Niagara-on-the-Lake DWS These PRVs are owned and operated by Niagara Region and can cause pressure fluctuations within the Town's drinking water system if their operating settings are not optimized.

6.3 Bevan Heights DWS

6.3.1 Niagara Falls Water Treatment Plant

The Bevan Heights Distribution System receives treated drinking-water from the Niagara Falls WTP via the City of Niagara Falls' drinking water distribution system. ***While the Town is not responsible for water treatment processes, a description of the Niagara Falls WTP is included for informational purposes*** *(refer to Section 6.2.2 of this Operational Plan)*.

6.3.2 Bevan Heights DWS: Water Distribution

The Bevan Heights Distribution System is a small municipal residential system servicing 72 customers. Water is received from the City of Niagara Falls' distribution system. The original water system here dates to the 1950's. All watermains, appurtenances and service lines within the Bevan Heights subdivision were renewed in 2002. On September 24, 2012 the Ministry of the Environment requested that the water system on Concession 6 Road (Niagara Falls boundary to Highway 405) be included with Bevan Heights for the purpose of reporting. The watermain on Concession 6 Road was constructed in 1994. There are approximately 16 fire hydrants and 19 valves in the Bevan Heights system (including Concession 6 Road).

6.3.3 Bevan Heights DWS: Source Water

The Bevan Heights DWS receives treated drinking water from the Niagara Falls WTP via the City of Niagara Falls DWS. Treated water leaving the WTP must meet or exceed all regulatory requirements. The Region monitors treated water turbidity and free chlorine residual at the WTP discharge and provides this data to the Town on a weekly basis.

6.3.4 Common Event-Driven Fluctuations

As the Town of Niagara-on-the-Lake is not responsible for water treatment, the Town's operations are not directly impacted by fluctuations in raw water quality. Impacts of event-driven fluctuations (i.e., storms) are managed by the Region at the treatment stage and do not typically affect the Town's operation of the drinking-water distribution system.

Water volume has not been an issue in the past for the Bevan Heights DWS. The Welland River serves as the raw water source for the Niagara Falls WTP, and river volumes do not fluctuate to a degree that would compromise WTP operations. However, water restrictions may be enforced on occasion to compensate for limitations in flow capacities; these limitations are observed in Regional infrastructure. Treated water supply to storage facilities is a Regional responsibility, but water demand may dictate the need for restrictions (i.e. in a drought). Water restrictions are typically only required during peak seasons, when treated water demand is at its highest. The Town of Niagara-on-the-Lake's By-Law #1943-88 is in place to enact water restrictions during situations of heightened demand.

6.3.5 Operational Challenges

Significant challenges are not commonplace in the operation of the Bevan Heights DWS. The system infrastructure is relatively new and is thus in good condition. Additionally, the types and configurations of system infrastructure are relatively simple in nature (i.e., hydrants and valves only).

7.0 Risk Assessment

A procedure has been created to describe the Town of Niagara-on-the-Lake's DWQMS Risk Assessment process. The ***DWQMS Risk Assessment*** procedure *(**PW-DW-PRO-004-001** – see Appendix I)* documents the process for completing the Town of Niagara-on-the-Lake's DWQMS Risk Assessment, including the legislative, regulatory and internal requirements for this risk assessment and the criteria for assessing risk.

8.0 Risk Assessment Outcomes

8.1 Niagara-on-the Lake DWS

The most recent DWQMS Risk Assessment for the Niagara-on-the-Lake DWS was completed on December 19, 2018. The completed Risk Assessment Matrix (see Appendix II) documents the results of this DWQMS Risk Assessment. All hazards were identified, assessed and addressed according to Section 7.0 of this Operational Plan and the Town's ***DWQMS Risk Assessment*** procedure (***PW-DW-PRO-004-001***).

The Town's Critical Control Limit Monitoring and Response SOPs can be found in Appendix III and include monitoring and/or response requirements for Critical Control Limit exceedances. These procedures are identified as follows:

- ***Water Sampling of Water Distribution System (PW-DW-SOP-012-001)***
- ***Annual Watermain Flushing (PW-DW-SOP-011-003)***
- ***MECP Watermain Disinfection Procedure, August 2020***
- ***AWWA C651-14, "Disinfecting Water Mains" (not included in Appendix III)***
- ***Niagara Municipalities Standard Operating Procedure for the Repair of Watermains (not included in Appendix III)***

8.2 Bevan Heights DWS

The most recent DWQMS Risk Assessment for the Bevan Heights DWS was completed on December 19, 2018. The completed Risk Assessment Matrix (see Appendix II) documents the results of this DWQMS Risk Assessment. All hazards were identified, assessed and addressed according to Section 7.0 of this Operational Plan and the Town's ***DWQMS Risk Assessment*** procedure (***PW-DW-PRO-004-001***).

The Town's Critical Control Limit Monitoring and Response SOPs can be found in Appendix III and include monitoring and response requirements for Critical Control Limit exceedances. These procedures are identified as follows:

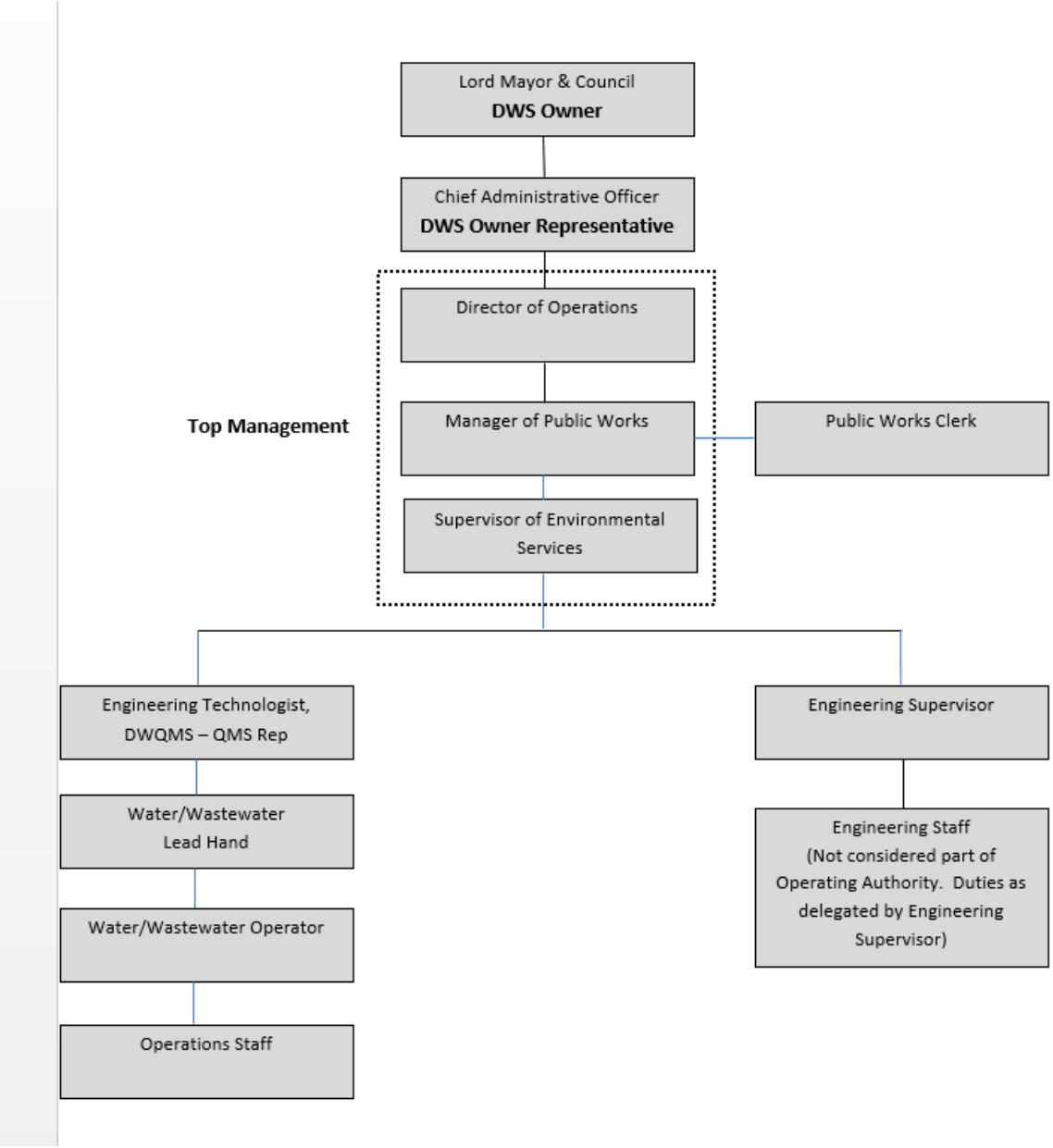
- ***Water Sampling of Water Distribution System (PW-DW-SOP-012-001)***
- ***Annual Watermain Flushing (PW-DW-SOP-011-003)***
- ***MECP Watermain Disinfection Procedure, August 2020***
- ***AWWA C651-14, "Disinfecting Water Mains" (not included in Appendix III)***
- ***Niagara Municipalities Standard Operating Procedure for the Repair of Watermains (not included in Appendix III)***

9.0 Organizational Structure, Roles, Responsibilities and Authorities

9.1 DWQMS Organizational Chart

The DWQMS Organizational Chart for the Town of Niagara-on-the-Lake's DWS is shown in Figure 9-1 below. The organizational structure depicted in Figure 9-1 applies in respect of both the Niagara-on-the-Lake and Bevan Heights drinking water systems.

Figure 9-1: Town of Niagara-on-the-Lake Organizational Chart



9.2 DWQMS Roles, Responsibilities & Authorities

The ***DWQMS Roles and Responsibilities Matrix (PW-DW-LM-005-001*** – *see Appendix I)* defines roles, responsibilities and authorities of staff within the Town of Niagara-on-the-Lake's Operating Authority and includes both general roles as well as DWQMS-specific responsibilities for each role[3]. The Matrix applies in respect of both the Niagara-on-the-Lake and Bevan Heights drinking water systems. The Matrix is

[3] The role descriptions within the Matrix may not include specific position responsibilities related to other aspects of Town operations. Job descriptions are to be considered as the primary source for inclusive summaries of the listed roles.

reviewed periodically as specified in the ***DWQMS Document Control Matrix (PW-DW-LM-002-001)*** or as significant organizational changes occur within the Operating Authority. The QMS Representative and affected Supervisors are responsible to ensure that staff remain aware of their respective roles, responsibilities and authorities.

10.0 Competencies

A procedure has been developed to outline training requirements for Certified Water Operators at the Town of Niagara-on-the-Lake. ***DWQMS Competencies & Training*** (***PW-DW-PRO-006-001*** – *see Appendix I)* applies to all Certified Water Operators employed with the Town of Niagara-on-the-Lake's Public Works Department and includes roles and responsibilities for other non-licensed staff that may be responsible for coordinating, documenting, tracking and/or assisting in training.

All Certified Water Operators must maintain a certificate applicable to that type of subsystem as the Niagara-on-the-Lake and Bevan Heights DWSs. The ORO must hold a certificate for that type of subsystem that is of the same class or higher than the class of the Niagara-on-the-Lake and Bevan Heights DWSs. Certified Water Operators must complete training activities in accordance with O. Reg. 128/04, "Certification of Drinking Water System Operators and Water Quality Analysts".

The QMS Representative, is primarily responsible for arranging training for Certified Water Operators. The QMS Representative is responsible for tracking training records to ensure that Certified Water Operators are completing training activities as required to maintain Drinking Water Operator Certification. The QMS Representative reviews training records on a quarterly basis.

The ***DWQMS Competencies Matrix*** (***PW-DW-LM-006-001*** – *see Appendix I*) outlines the competencies of Operating Authority Personnel whose work directly affects drinking-water quality. The Matrix applies in respect of both the Niagara-on-the-Lake and Bevan Heights drinking water systems. The descriptions highlight only those required competencies relating to work affecting drinking-water quality; job descriptions are to be observed as the primary source of inclusive summaries for the listed positions.

All Certified Water Operators must complete the Ministry of the Environment's new mandatory training courses in order to maintain Drinking Water Operator Certification.

11.0 Personnel Coverage

A procedure, ***DWQMS Personnel Coverage*** (***PW-DW-PRO-007-001*** – *see Appendix I*), has been developed to document the processes used by the Town of Niagara-on-the-Lake to ensure that adequate staffing & personnel coverage is maintained for effective DWS operation. This is an integrated procedure that applies in respect of both the Niagara-on-the-Lake and Bevan Heights drinking water systems. The procedure

details personnel coverage measures to be followed during regular business hours as well as evenings, weekends and holidays.

12.0 Communications

A procedure, ***DWQMS Communications*** (***PW-DW-PRO-008-001 –*** *see Appendix I*), has been developed to outline the processes and methods used by the Top Management of the Town of Niagara-on-the-Lake's Operating Authority in communicating with the Lord Mayor and Council, Operating Authority staff, DWS Vendors, and the public on matters relating to the Town's drinking-water system.

13.0 Essential Supplies and Services

DWQMS Essential Supplies and Services (***PW-DW-PRO-009-001*** – *see Appendix I*) describes the processes by which the Town of Niagara-on-the-Lake identifies the supplies and services that it deems essential to its water-related operations and verifies the quality of the supplies and services insofar as they impact drinking-water quality. This is an integrated procedure that applies in respect of both the Niagara-on-the-Lake and Bevan Heights drinking water systems.

The ***List of Essential Drinking-Water System Supplies and Services*** (***PW-DW-LM-009-001*** – *see Appendix I*) lists essential supplies and services used in the operation & maintenance of the Town's drinking-water systems; these supplies and services are subject to the requirements of ***DWQMS Essential Supplies and Services (PW-DW-PRO-009-001)***. Supplies and services are deemed to be "essential" if they are essential to the safe delivery of water and/or if they relate to disinfection of drinking-water or drinking water infrastructure.

A Quality Assurance Review is undertaken for all DWQMS essential supplies and services as necessary (ie: new vendor, changes in management, materials or supplies). Essential supplies and services are evaluated according to criteria identified in ***DWQMS Essential Supplies and Services (PW-DW-PRO-009-001)***.

Results of the Quality Assurance Review are forwarded to Top Management along with any recommendations for Vendor non-conformances, Vendor continual improvement initiatives or Vendor exclusions. Top Management and any other affected Supervisors are informed if action is required with respect to a DWS Vendor.

Non-conformances may be issued to DWS Vendors and documented as per ***DWQMS Preventive and Corrective Action (PW-DW-PRO-017-001 –*** *see Section 21.0 of this Operational Plan)*. Non-conformances are communicated to Vendors with a requested date for response. Vendor nonconformance reports (with corrective actions) are reviewed on an annual basis as part of the Vendor QA Review.

14.0 Review and Provision of Infrastructure

A procedure has been developed to outline the process followed by the Town of Niagara-on-the-Lake in reviewing the adequacy of its drinking-water system infrastructure. ***DWQMS Review and Provision of Infrastructure*** (***PW-DW-PRO-010-001 –*** *see Appendix I)* is an integrated procedure that applies in respect of both the Niagara-on-the-Lake and Bevan Heights drinking water systems.

The DWS infrastructure review process is depicted as follows:

Members of the Town of Niagara-on-the-Lake's DWS Infrastructure Review Team are identified in ***DWQMS Review and Provision of Infrastructure (PW-DW-PRO-010-001)***. The DWS Infrastructure Review Team meets on an annual basis to review the previous year's operational history and proposed infrastructure rehabilitation plans for the subsequent year. The Team can complete a separate Infrastructure Review for each DWS, or may elect to complete an integrated Infrastructure Review that examines both DWSs.

15.0 Infrastructure, Maintenance, Rehabilitation and Renewal

The Town of Niagara-on-the-Lake's Public Works Department has established several infrastructure maintenance, rehabilitation and renewal programs to protect the integrity of its drinking-water system infrastructure and the quality of its drinking-water.

15.1 Infrastructure Maintenance Programs

Table 15-1 (following page) summarizes the drinking-water system infrastructure maintenance programs that are in place at the Town of Niagara-on-the-Lake. These programs apply in respect of both the Niagara-on-the-Lake and Bevan Heights drinking water systems unless otherwise noted.

Infrastructure maintenance programs are completed according to the levels of services outlined in Table 15-1. Deficiencies are corrected on a priority basis. Any fire hydrant deficiencies are considered to be of high priority and are repaired as soon as possible.

The Town of Niagara-on-the-Lake strives for continuous delivery of safe drinking water. To this end, the Town has established Operational Performance Indicators as a means of ensuring the continued performance of its infrastructure and the effectiveness of its maintenance programs. The table includes a summary of the Operational Performance Indicators outlined for selected infrastructure components. Operational Performance Indicators are established based on unexpected failures in infrastructure, and do not include deficiencies discovered during the completion of routine maintenance programs.

Table 155-1: DWS Infrastructure Maintenance Programs

Infrastructure Component	Level of Service			Operational Performance Indicator	Tracking Method
	Maintenance Activities	Frequency	Applicable Procedure		
Watermains	Complete emergency watermain break repairs.	As required.	Watermain Break Protocol (PW-DW-SOP-011-001)	• Less than 15 system isolations required per year due to watermain breaks. • Average repair time ≤ 24 hours per break (annual average).	Niagara-on-the-Lake Watermain Repair / Watermain Appurtenance Installation Report
	Complete leak detection.	As required.	Leak Detection (PW-DW-SOP-011-002)	• Infrastructure Leakage Index **<X%**.[4]	Contractor Report
	Complete watermain flushing.	Annually	Annual Watermain Flushing Program (PW-DW-SOP-011-003)	• Completion of Program. • Water quality indicators from sampling and testing	Distribution System Log Book and/or GIS app. or hydrant flushing reports
Valves	Inspect and exercise valves, check valve boxes for deficiencies and paint valve box lids, perform minor maintenance on valves.	Complete for whole system once every 5 years.	Water Valve Maintenance (PW-DW-SOP-011-004)	• Less than **1**0 inoperable valves permitted per 100 required uses.	Valve Inspection and Maintenance Checklist and/or GIS app.

[4] An operational Performance Indicator will not be set for Infrastructure Leakage Index until reliable data is available.

Infrastructure Component	Level of Service			Operational Performance Indicator	Tracking Method
	Maintenance Activities	**Frequency**	**Applicable Procedure**		
Fire Hydrants	Inspect and lubricate hydrants. Exercise secondary valves. Perform scheduled maintenance. Paint hydrant barrels.	Complete once every 5 years.	Hydrant Maintenance (PW-DW-SOP-011-005)	• Completion of Program.	Hydrant Inspection and Maintenance Checklist and/or GIS app.
	Check for operational problems (i.e. freezing).	Nov 1 to Mar 31 each year – monthly checks.	Hydrant Maintenance (PW-DW-SOP-011-005)	• None.	Hydrant Inspection and Maintenance Checklist and/or GIS app.
	Complete hydrant flow testing.	As needed.	Contractor's Protocol	• None.	Contractor Report
	Hydrant backflow preventer testing	Annually	Contractor's Protocol	• Backflow test reports	Contractor Report
Curb Stops & Boxes	Repair/replace curb stops and/or curb boxes.	As needed.	None	• Operational	Service Location Card
Water Services	Investigate and repair water service leaks on public property.	As needed.	Maintenance of Water Services on Public Road Allowances (PW-DW-SOP-011-007)	• Average time to repair following locates $\leq$ 7 days.	Service Location Card

Infrastructure Component	Level of Service			Operational Performance Indicator	Tracking Method
	Maintenance Activities	**Frequency**	**Applicable Procedure**		
Bulk Water Stations (Niagara-on-the-Lake DWS only)	Complete visual inspection of bulk water stations.	Monthly.	None	• Two stations not out of service simultaneously. • Each station out of service for less than 1 week /year.	Bulk Water Station Inspection Checklist
	Inspect backflow prevention devices.	Annually.	Contractor Protocol	• Zero failures permitted.	Contractor Report
Blow-Offs	Repair and replace.	As needed (based on flushing results.	None	• Zero adverse water quality incidents permitted as a result of low chlorine residuals.	Distribution System Log Book
	Flush	Coincide with Flushing Program	Annual Watermain Flushing Program (PW-DW-SOP-011-003)	• Zero failures permitted.	Distribution System Log Book
Water Meters	Test & Replace	As needed	Testing and Repair of Water Meters (PW-DW-SOP-011-004)	• Meter age • Meter calibration test report	Service Location Card

15.2 Infrastructure Rehabilitation & Renewal Programs

At the Town of Niagara-on-the-Lake, infrastructure rehabilitation and renewal activities are typically financed via capital expenditures and are thus examined in more detail during the DWQMS Infrastructure Review process (see Section 14.0 of this Operational Plan). Potential rehabilitation and renewal projects are evaluated on a case-by-case basis. Renewal activities are preferred where rehabilitation activities are not expected to adequately improve infrastructure performance and are not expected to be cost-beneficial.

Table 155-2 documents typical drinking-water system infrastructure rehabilitation and renewal programs in place at the Town of Niagara-on-the-Lake. These programs apply in respect of both the Niagara-on-the-Lake and Bevan Heights drinking water systems.

Table 155-2: DWS Infrastructure Rehabilitation & Renewal Programs

Infrastructure Component	Rehabilitation & Renewal Activities
Watermains – Replacement	Replacement initiatives are prioritized based on main break history, hydraulic capacity and issues with maintenance of chlorine residual. Water services that do not meet current Town standards may be replaced as needed in conjunction with replacement of the associated watermain.

16.0 Sampling, Testing and Monitoring

A procedure has been developed to outline the required distribution system sampling, testing and monitoring activities completed by the Town of Niagara-on-the-Lake's Operating Authority Staff in the operation of the Town's drinking-water systems. ***DWQMS Sampling, Testing and Monitoring*** (***PW-DW-PRO-012-001*** – *see Appendix I*) also outlines the types and numbers of samples required, frequency of sampling and Standard Operating Procedures to be followed. This is an integrated procedure that applies in respect of both the Niagara-on-the-Lake and Bevan Heights drinking water systems.

Sampling and monitoring requirements for the Town's drinking-water distribution systems are identified in ***DWQMS Sampling, Testing and Monitoring*** (***PW-DW-PRO-012-001***). In some cases, selected samples are required to be taken at a point in the system where conditions are most challenging[5]. Where this is a requirement for the sample in question, sample location conditions are outlined in the procedure.

Treated water is provided to the Town of Niagara-on-the-Lake by the Niagara Region; as such, the Town's Operating Authority Staff are responsible for distribution system sampling as required by O. Reg. 170/03. The Niagara Region is required to conduct raw water and treated water sampling activities.

The Town's contracted accredited testing laboratory provides immediate oral notification to the Town in the event of an adverse test result. The Town then provides immediate oral notification to the Niagara Medical Officer of Health and the Ministry of the Environment Spills Action Centre. Guidance in reporting and responding to Adverse Water Quality Incidents is provided in ***Reporting of Adverse Test Results (PW-DW-SOP-012-002*** – *see Appendix I)* and ***Corrective Action for Adverse Water Quality Samples (PW-DW-SOP-012-003*** – *see Appendix I)*.

The Drinking-Water System Annual Reports summarize all drinking-water system sampling and testing, including any adverse results. This report is made available to the public upon completion each year, and forms the basis for a more detailed Summary Report that is presented to Council for information purposes.

[5] As per O. Reg. 170/03, "Drinking Water Systems".

17.0 Measurement and Recording Equipment Calibration and Maintenance

DWQMS Measurement and Recording Equipment Calibration and Maintenance (***PW-DW-PRO-013-001*** – *see Appendix I*) outlines requirements for the calibration and verification of measurement and recording equipment used for sampling, testing and monitoring.

All measurement, monitoring and recording devices owned by the Town of Niagara-on-the-Lake and used in Water Distribution Operations are subject to periodic calibration by Operating Authority Staff and to occasional calibration by the manufacturer, if required***. DWQMS Measurement and Recording Equipment Calibration and Maintenance*** (***PW-DW-PRO-013-001***) lists the measurement and recording equipment used by the Operating Authority in respect of the drinking-water system and specifies calibration requirements for each piece of equipment.

Types of equipment used in DWS sampling, testing and monitoring include:

- Pocket Colorimeters;
- pH Testers;
- Portable pressure gauges.

These pieces of equipment are used to complete sampling, testing and monitoring activities for both of the Town's drinking water systems.

For each piece of equipment, ***DWQMS Measurement and Recording Equipment Calibration and Maintenance*** (***PW-DW-PRO-013-001***) provides information including manufacturer name, equipment model number and serial number, calibration frequency, and associated calibration SOPs.

18.0 Emergency Management

The purpose of ***DWQMS Emergency Management (PW-DW-PRO-014-001*** – *see Appendix I)* procedure is to identify the Town's ***Water Operations Emergency Response Plan (PW-DW-MAN-014-001***), to specify training and testing requirements for this Plan, and to outline emergency communication protocols and emergency contacts.

The ***Water Operations Emergency Response Plan (PW-DW-MAN-014-001)*** applies in respect of both the Niagara-on-the-Lake and Bevan Heights drinking water systems. The ***Emergency Response Plan*** includes detailed emergency response procedures for the following identified emergencies; these are listed below and are included as Appendix IV to this Operational Plan.

- ***Biological Contamination of Water (PW-DW-PRO-014-002)***
- ***Chemical Contamination of Water – Known Contaminant (PW-DW-PRO-014-003)***
- ***Chemical Contamination of Water – Unknown Contaminant (PW-DW-PRO-014-004)***
- ***Suspected Intentional Contamination of Water (PW-DW-PRO-014-005)***
- ***Suspected Backflow Event (PW-DW-PRO-014-006)***
- ***Unexpected Loss of System Pressure (PW-DW-PRO-014-007)***
- ***Loss or Decrease of Regional Water Supply (PW-DW-PRO-014-008)***
- ***Drinking Water Quality Advisory / Boil Water Advisory (PW-DW-PRO-014-009)***

Communication protocols for each emergency scenario are embedded in the respective emergency response procedures.

A list of emergency contacts is found in ***DWS Emergency Contact List*** (***PW-DW-LM-014-001*** *– see Appendix IV)*. The Contact List includes contact information for both internal and external Water Operations contacts that may be required in an emergency.

Emergency response procedure training requirements for Operating Authority staff are outlined in Table 1 of ***DWQMS Emergency Management (PW-DW-PRO-014-001)***.

On an annual basis, at least one emergency response procedure contained within the ***Water Operations Emergency Response Plan (PW-DW-MAN-014-001)*** is selected for staff training and testing. Emergency response procedures are reviewed and updated as required in conjunction with these periodic testing activities.

19.0 Internal Audits

A procedure has been created to describe the Town of Niagara-on-the-Lake's DWQMS Internal Auditing Program & associated processes. ***DWQMS Internal Auditing*** (***PW-DW-PRO-015-001*** – *see Appendix I*) documents required activities & processes relating to the planning, execution and documentation of DWQMS Internal Audits, including recording of non-conformances and reporting of results to Top Management and the Owner.

DWQMS Internal Auditors are selected by Top Management and must achieve and maintain defined competency requirements in order to fulfill this role. Required competencies include the following:

- Internal Auditors must possess an understanding of both the requirements and the intent of the DWQMS Standard;
- Internal Auditors must receive appropriate Internal Auditor Training;
- Internal Auditors should have a good knowledge of drinking-water system operations and of drinking water quality requirements;
- Internal Auditors must be familiar with the Public Works Department's DWQMS auditing procedures and protocols.

The Lead Auditor and QMS Representative work together to plan and execute the annual DWQMS Internal Audit with the assistance of the Internal Audit Team. The role of Lead Auditor can be fulfilled by the QMS Representative if desired. Internal Auditors must remain objective and impartial throughout the audit process, and cannot audit their own work or work areas.

Audit conclusions may identify actual or potential non-conformances in current operations or processes, indicating the need for corrective action or preventive action, respectively. Auditors may also suggest potential improvement initiatives. Actual and potential non-conformances must be documented and resolved according to the Operating Authority's defined continual improvement process (refer to Section 21.0 of this Operational Plan). Completion and effectiveness of corrective and preventive actions are verified by the Lead Auditor or an Internal Audit Team delegate.

Upon completion of scheduled internal audits, the QMS Representative (or designate) reviews audit findings and compiles the information for presentation to Top Management as part of the annual DWQMS Management Review (refer to Section 20.0 of this Operational Plan). Audit findings must be considered in future relevant audits.

The Town of Niagara-on-the-Lake's DWQMS must be audited in its entirety at least once every calendar year.

20.0 Management Review

A procedure has been developed to document the process followed by Top Management in planning, executing and documenting DWQMS Management Reviews, including provision of feedback to the Operating Authority and reporting of review results to the Owner.

The Management Review process ensures that all levels of the organizational structure are kept informed and aware of the DWQMS and DWS performance. The QMS Representative has a significant role in the DWQMS Management Review process, compiling all required input data for presentation to Top Management and attending Management Review meetings as a facilitator.

Required inputs to the review process are listed in ***DWQMS Management Review*** (***PW-DW-PRO-016-001***); examples include details of operational performance, drinking water quality results, consumer feedback and staff suggestions. Other Town staff may be invited to assist in presenting information to the Management Review Team, or in reviewing the information presented, where they offer additional expertise or insight regarding the subject matter. Top Management is responsible for reviewing the input materials presented, identifying deficiencies, and formulating and delegating action items to address the deficiencies.

Management Review meetings can be conducted as one meeting per calendar year at a minimum, or may be split into several smaller meetings over the course of the year. Either method is acceptable as long as all required review inputs and agenda items are addressed over the course of the year.

DWQMS Management Review outputs are documented and retained as proof of completion, and results of the Management Review are communicated to the Owner as per ***DWQMS Management Review (PW-DW-PRO-016-001)***.

21.0 Continual Improvement

A procedure has been developed to document the process followed to ensure effective resolution of DWQMS non-conformances. ***DWQMS Preventive & Corrective Action*** (***PW-DW-PRO-017-001*** – *see Appendix I*) addresses both potential and actual non-conformances and includes root cause analysis, identification and implementation of preventive or corrective actions, and verification of their effectiveness.

The handling of Adverse Water Quality Incidents (AWQIs) is not included in the scope of ***DWQMS Preventive & Corrective Action*** (***PW-DW-PRO-017-001***). Separate procedures, ***Reporting of Adverse Test Results (PW-DW-SOP-012-002)*** and ***Corrective Action for Adverse Water Quality Samples (PW-DW-SOP-012-003),*** have been developed to document processes for addressing these occurrences.

Potential and actual DWQMS non-conformances are identified through several different means, including but not limited to DWQMS audits, internal and external communication, monitoring and measurement of DWQMS performance, employee observations/suggestions, and DWQMS Management Reviews. The nonconformance is documented on a ***DWQMS Preventive & Corrective Action Request Form (PW-DW-FRM-017-001)***; this form is used to document the root cause of the non-conformance, associated preventive and/or corrective actions, and follow-up verification activities. Operating Authority Staff are selected to implement preventive or corrective actions. The QMS Representative (or designate) then verifies the effectiveness of the preventive or corrective action. The Director of Operations (or designate) is responsible for approving and closing DWQMS Preventive and Corrective Requests, and will only do so once the effectiveness of the implemented solution has been verified by the QMS Representative.

Continual Improvement is tracked through the procedure ***Continual Improvement (PW-DW-PRO-017-002).*** All items deemed as Continual Improvement are logged and subsequently evaluated for effectiveness through the ***DWQMS Continual Improvement Action Item Log (PW-DW-FRM-018-001).***

The QMS Representative retains records of DWQMS Preventive & Corrective Action Requests and the Continual Improvement Action Items and generates an annual summary for presentation as an input to DWQMS Management Reviews.