Department/Division:	Public Works / Pelham Distribution System
Report:	Municipal Summary Report
Covering:	January 1, 2022, to December 31, 2022

1. Purpose

This report was prepared by the Director of Public Works and Manager of Public Works for the Owner of the Pelham Distribution System, the Corporation of the Town of Pelham, to be presented to Council.

Two annual water reports are required by the Ministry of the Environment, Conservation and Parks (MECP) to be prepared: (1) the 'MECP Annual Report' (O.Reg. 170/03 section 11), and (2) the municipal 'Summary Report' (O. Reg. 170/03 schedule 22).

As required by QMS-PROC-021 in the Town of Pelham's Quality Management System, results of the annual management and infrastructure review shall be presented to the Owner through the Annual Municipal Summary Report.

As legislated, Council is responsible as the Owner of the water system for ensuring these reports are prepared and available to the public each year.

The MECP Annual Report has been prepared and submitted as an attachment to the Public Works Report #2023-0041, 2022 Pelham Distribution System Summary Report.

This is the Municipal Summary Report.

To enhance the communication and understanding of these reports, this Municipal Summary Report contains additional non-legislated information on the drinking water system operations and water quality.

2. Definitions

"*DWQMS*" means Drinking Water Quality Management Standard.

"*MECP*" means Ontario Ministry of the Environment, Conservation, and Parks.

"*WTP*" means Water Treatment Plant.

"*QMS*" means Quality Management System.

"*OIC*" means Operator in Charge of the distribution system, as per O.Reg 128/04

"*ORO*" means Overall Responsible Operator of the distribution system, as per O.Reg 128/04

"*HAA"* means Haloacetic Acid. Haloacetic Acids in drinking water are a by-product of Chlorine disinfection.

"*THM*" means Trihalomethanes. Trihalomethanes in drinking water are a by-product of Chlorine disinfection.

"*CFU"* means Colony Forming Units. It is a unit of measure for bacteriological contaminants in drinking water.

"*HPC*" means Heterotrophic Plate Count. It is a method that measures colony formation on culture media of heterotrophic bacteria in drinking water.

3. System Overview

The provision of drinking water for residents in the Niagara Region is a responsibility shared between two tiers of municipal government. The Niagara Region is responsible for treatment and supply of the water to the Town of Pelham via transmission mains. The Town of Pelham is responsible for distributing water to local consumers via its own network of distribution pipes.

The Pelham Distribution System is a Class 2 water distribution subsystem. The system consists of approximately 86 km of watermains varying in size from 50mm to 400mm diameter providing water to approximately 14025 residents through 5399 accounts within the general urban area.

The service area is approximately 14 km^2 and includes the Villages of Fonthill, Ridgeville and Fenwick. The system receives treated drinking water from the Welland Water Treatment Plant located on Cross Street in the City of Welland. The treatment plant is owned and operated by the Regional Municipality of Niagara. The plant receives its raw water from the Welland Recreational Canal. Treated water is transmitted to the Town by way of a 750mm diameter watermain to the Shoalts Drive Reservoir. The reservoir, which includes chlorination, is also Regionally-owned and operated. Water enters the Pelham Distribution System at the reservoir outlet.

The Town of Pelham owns and operates a water filling station with side-fill and a backflow prevention device to serve consumers outside of the urban boundary who do not have direct access to the distribution system. Water haulers must obtain approval from the Niagara Region before being permitted to use the station.

The Town of Pelham owns a small pressure booster pump station which is located on the Niagara Region's Elevated Tank Property. This pump is used to improve water pressure in the Chestnut Ridge development area. The normal operating pressure in the area is low due to its geographic location in relation to the elevated tank that supplies distribution supply and pressure by way of gravity.

The Town of Pelham Distribution System consists of 5 pressure zones separated by Pressure Reducing Valves (PRV). In Pelham, because of our unique topography, maintaining safe operating pressure within the system is a delicate balance. Increasing pressure in one area can cause damage to municipal infrastructure and private plumbing downstream.

4. Water Quality Testing

Ontario Regulation 170/03 prescribes water quality testing requirements for municipal drinking water systems.

The requirements prescribed by the MECP include: test parameters, number of test samples, frequency of testing, location of testing, reporting of test results, and reporting and corrective action of adverse test results, amongst other items. Operational guidelines are parameters used to monitor the general quality of water and the performance of the system.

In 2012, the Town of Pelham qualified for an exemption from collecting lead samples from residential or non-residential plumbing under the community lead testing program; however, reduced sampling must still take place in four locations within the distribution system. As such, the Town has continued with its lead testing program in the distribution system, with no concerns.

The Town carried out testing in 2022 as prescribed by legislation.

In addition to the prescribed sampling, the Town tested for water quality in response to complaints from consumers. Complaints generally refer to colour, odour, pressure, particulate, supply and/or taste.

The Town responded to 8 water quality/supply complaints in 2022. Five were related to low pressure concerns, two to water colour, and one to odour concerns. All were resolved promptly.

Taste and odour episodes are often related to a natural phenomenon caused by seasonal biological changes in the source water. These changes may produce odour-causing chemical compounds that can be detected by humans at very low levels. Most municipalities in Ontario which obtain their water supply from surface water sources experience this problem periodically in the summer or early fall. Also, private plumbing fixtures including small water filtration systems and drain traps can also contribute to concerns regarding taste and odour of municipally supplied water. Once identified, most of these can be resolved quickly and easily through regular maintenance completed by the property owner.

Water Treatment Plants are equipped with various filtration systems designed to reduce the effects of taste and odour but may not eliminate it entirely.

Table 1- Testing requirements and results.

Table 1 – 2019 Testing Summary					
Parameter	**# Samples Required**	**# of Samples Taken**	**Legislated Requirement**	**Guideline**	**# of Samples Exceeding Limit**
Esherichia Coli (bacteriological)	22 per month	~ 41 per month	0 CFU/100mL Not detected	--	0

Total Coliform (bacteriological)	22 per month	~ 41 per month	0 CFU/100ml Not detected	--	**3**
HPC (heterotrophic plate count)	6 per month	~ 41 per month	--	< 500 CFU/100mL (AWWA c651-14)	0
Trihalomethanes	1 per quarter	3 per quarter	100 ug/L (annual running average)	--	0
Haloacetic Acids	1 per quarter	3 per quarter	80 ug/L (annual running average)	--	0
Free Chlorine	7 per week	13 per week	>=0.05 mg/L <=4.0 mg/L	--	0
pH	8 per year	8 per year	--	6.5 – 8.5 Operational guideline	0
Alkalinity	8 per year	8 per year	--	30 – 500 Operational guideline	0
Lead	8 per year	8 per year	0.01 mg/L	--	0
Pressure	None	5 per month (taken from each pressure zone)	--	>=28psi	0

5. Adverse Water Quality Incidents

An "adverse water quality incident" refers to a water quality test result exceeding the legislated requirements shown in **Table 1**.

A total of **three** incidents of adverse water quality conditions were detected in the system in 2022. These incidents were resolved promptly through resampling and testing as per QMS FORM 017 Response to Adverse Water Quality Incident.

6. MECP Drinking Water System Inspection Report

In January 2023, the Town's distribution system underwent an inspection by a MECP Drinking Water Inspector. The inspection included a review of operational records from 2022.

The Town received a final inspection rating of 100%.

The Pelham Distribution System Inspection Report is included in the 2022 Pelham Water Distribution System Summary Report.

7. Regulatory Updates

There are no new regulatory updates to report on at this time.

8. Competency, Licensing and Training

Operator training is required by law to maintain drinking water licenses and ensure competency. Operators and key water staff participate in a number of diverse course offerings aimed at broadening their knowledge.

The Town of Pelham owns and operates a Class 2 Water Distribution System and a Class 2 Wastewater Collection System. The Town of Pelham Water Division currently has a compliment of a Manager of Public Works, Supervisor of Water and Wastewater, and three Water Operators. All water and wastewater operators must maintain a Water Distribution License and Waste Water Collection Facility License to operate the Town's systems.

9. Flow Data

Water consumed by the Town of Pelham is measured by the Niagara Region and provided monthly to the Town. In 2022, a total of1,509,890 cubic meters (m^3) of water flowed to the Town of Pelham in total. (1 cubic meter of water = 1,000 litres).

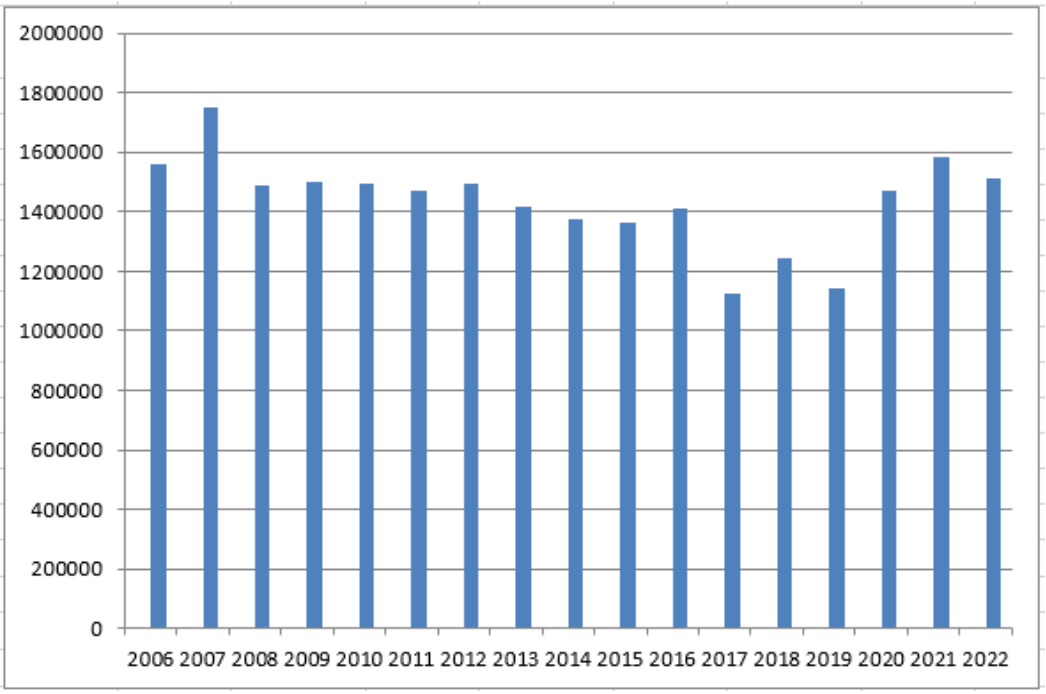
The Town of Pelham's accounted water use which includes revenue, and accounted non-revenue water use totaled 1,309,359m^3. The total volume of unaccounted for water in 2022 was 200,531m^2. Water loss is the difference between the total flow input and the accounted for water volume shown as a percentage. In 2022 the Town of Pelham's water loss was 13%.

Table 2 – Annual Totals

Year	Supply (m^3)
2011	1,469,470
2012	1,491,850
2013	1,420,220
2014	1,374,130
2015	1,364,450
2016	1,410,410
2017	1,122,740
2018	1,243,900
2019	1,150,570
2020	1,473,630
2021	1,584,270
2022	**1,509,890**

The totals in this table are also reflected in the graph below, **Figure 1**

Figure 1 – 2021 Total Water Supplied by the Region of Niagara



All water demands were met in the system; thus the Town was not required to implement the additional use restrictions under section 4(p) of the Water Supply By-law No. 3198-2011.

The Town's Drinking Water License does not limit demand of flows to the Town, so a comparison to license limits is not required. The 2021 average daily consumptions are shown in **Table 3**, along with the maximum daily flows for each month.

Table 3 – 2022 Daily Water Usage

Month	Average Daily Flow (m^3)	Maximum Flow in One Day (m^3)
January	3574	4140
February	3509	4930
March	3447	4380
April	3468	4440
May	4354	6270
June	5316	7700
July	6198	**9060**
August	5202	7660
September	4123	6230
October	3557	4780
November	3357	4260
December	3465	4160

The 2022 highest demand day occurred in July, which aligns with the typical high monthly demands in the summer.

No servicing concerns are noted. The Niagara Regional Master Servicing Plan (MSP) lists the firm capacity of the Shoalts Drive Reservoir to be 19,400 m3 / day. The MSP has identified future projects including the replacement of the Pelham Elevated Water Tank and increased pumping capacity at the Shoalts Drive Reservoir to accommodate projected 2041 servicing needs.

10. Capital Projects and Purchases

The Town updated the 20-year capital plan. Although efforts to ensure it represents the most current water distribution system improvement needs were made, many allowances were necessary based on competing capital infrastructure needs.

The replacement of watermain on Pelham Street from John Street to Spruceside South has been completed as part of the Pelham Street Phase 3 project. Park Lane watermain replacement has also been completed from HWY 20 to 55 Park Lane in Marlene Stewart Streit Park.

Developments involving the construction of new watermain by developers included: Saffron Valley Phase three and Merritt Road extension.

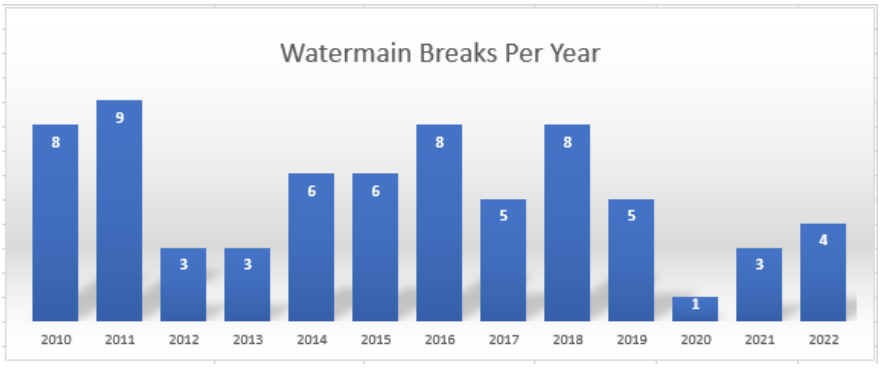
11. Rehabilitation and Repairs

A Total of **4** watermain breaks occurred in 2022, summarized in **Table 4. Figure 2** shows the overall trend for the total number of watermain breaks caused by pipe material and age.

Table 4 – Watermain Break Summary

Date	Location	Pipe Material	Suspected Cause	Planned Replacement
Jan 23,2022	Lorimer Street	Cast Iron	Bedding, Age	2029
Jan 24, 2022	Pinecrest	Cast Iron	Bedding, Age	2024
Jan 31,2023	Strathcona	Cast Iron	Bedding, Age	2024
Dec 18,2022	Broad Street	Cast Iron	Bedding, Age	--

Figure 2 – Town of Pelham – Watermain Breaks per Year



In addition to watermain repairs, in 2022 Town of Pelham Staff replaced 4 leaking water services.

Regular maintenance and repairs are required at our Chestnut Ridge Booster Pump Station. Since installation these have been completed by the Niagara Regional Staff through a Maintenance Agreement. The Town continues to work closely with the Region of Niagara to maintain close communication about pressure or supply interruptions related to this pumping station.

The Town of Pelham owns and operates a Water Loading Station at 294 Canboro Road. Minor maintenance tasks are performed throughout the year including backflow prevention device testing and sampling programs.

12. Backflow Prevention

The Ontario Building Code requires backflow prevention devices are to be installed at each connection to new buildings where a potentially severe health hazard may be caused by backflow. The Town relies on the Building Code to ensure that backflow preventers are installed in new buildings.

The creation of a backflow prevention policy associated by-law and program was placed on hold due to the Covid-19 pandemic and existing labour resources. In 2023 Staff will begin surveying ICI locations to create a backflow preventor contact list as a first step in the process of program development.

13. Leak Detection

The Town of Pelham did not complete a leak detection program in 2022. Staff will facilitate a leak detection program on remaining cast iron watermains in 2023.

14. Municipal Drinking Water Licensing Program

The Municipal Drinking Water Licensing Program is a five-stage initiative by the MECP under the Safe Drinking Water Act, 2002. The Town of Pelham maintains its Certificate of Accreditation as an Operating Authority for its water distribution system, and the system license and permit(s) are in place. **Table 6** lists the status of the key elements for water licensing.

Table 6 – Municipal Drinking Water Licensing Program Status

Stage	Status
License #072-101	Renewed July 23,2019 – Expires July 22, 2024
Permit #072-201	Active and current – No expiry
Operational Plan	Endorsed by Council March 21, 2021
Accreditation	Maintains full accreditation. Expires April 29, 2024
Financial Plan	Updated in 2018, covering 2019 – 2024 inclusive

15. Quality Management System

The Quality Management System (QMS) is fully integrated into Water operations and maturing and improving with time. Council should remain aware of its commitments in the QMS Policy, which is the framework upon which to set the QMS.
The current Operational Plan is available through the network or in printed copies at select locations.

16. Infrastructure Review

The Infrastructure Review is a required component of the DWQMS, where infrastructure includes piping and related infrastructure, but also buildings, workspace, process equipment, hardware, software, and supporting services such as transport or communication. The purpose of the review was to assess the adequacy of the infrastructure necessary to operate and maintain the water system.

Recommendations from the annual 2022 review were translated accordingly into the 2023 water operational and capital budget requests, and into the 20-year Capital Plan updates, and are communicated in this report below.

The Infrastructure Review has been included in **Appendix A** of this report

17. Management Review

Management review is a required component of the DWQMS. In November 2022, the Director of Public Works and Manager of Public Works completed a management review of the QMS in alignment with the budget and capital planning process, in accordance with the Town's Operational Plan. Recommendations will be translated accordingly into future water operational and capital budget requests, and into the 20-year Capital Plan updates, and are communicated in this report below.

The Management Review has been included in **Appendix B** of this report

18. Internal Audit Results

Results from the QMS internal audit performed in November 2022 are summarized. The internal audit must be performed once per year.

The Internal Audit found three (3) opportunities for improvement. All opportunities for improvement were discussed during management review as action items.

The Internal Audit Results have been included in **Appendix C** of this report

19. External Audit Results

In April 2022, the Town engaged NSF as a third party auditor to the QMS, in accordance with the Town's drinking water license requirements.

No non-conformances or corrective action requests were identified. One opportunity for improvement was identified.

The External Audit Results have been included in **Appendix D** of this report

Appendix A - Infrastructure Review

Town of Pelham
Form

Infrastructure Review Summary

Revision #03 Document #QMS FORM 026

The Corporation of the Town of Pelham Drinking Water Distribution System	
Meeting Location:	MCC, 100 Meridian Way, Fonthill ON
Date / Time:	30 March 2022, 9:00 – 11:00am
Attendees:	Jason Marr (DPW), Ryan Cook (MPW), Dave Vaccaro (SWW)
Minutes Recorded by:	Sandra Tavares (Facilitator, *Tavares Group Consulting Inc.*)
Minutes to be distributed to:	DPW, MPW, SWW

Infrastructure Review Meeting Minutes	
Details / Discussion Points / Issues Identified	**Recommendation** *(for budget ask)* **/ Action Items** *(tracked via QMS LIST 006)*
Outcomes of the **Risk Assessment** (check what applies): ☐**12-month annual** ☒ 24-month annual ☐ 36-month reassess	No additional recommendations or action items.
• Reviewed the Town of Pelham's **Critical Control Point (CCP), loss of chlorine residual**, which has decreased in risk, and associated Critical Control Limit (CCL = 0.20 mg/L after routine flush) including processes in place to maintain (i.e., Spring/Fall and watermain flushing confirmed by SWW) and monitoring through weekly distribution system Cl_2 sampling. There have been no **CCL deviation** since 11-Jun-2020 when it was identified as part of Annual MECP Inspection 14-Dec-2020 review of QMS FORM 008 [Twice Weekly now removed from title] Chlorine Residual Sampling Program Forms. • No other risks / hazards to be addressed by budget aside from backflow which is currently on hold due to COVID (**linked to risk assessment outcome #11**) and tracked via QMS LIST 006 Corrective and Preventive Action List.	
Watermain – servicing, replacement, monitoring, operating & capital needs, other	No additional recommendations or action items.
• Discussed the **2022 Approved Capital Budget** which included $30K for replacement fittings, design for Camber watermain replacement and Pine Crest area ($4M grant submission for cast iron is waiting on Federal approvals to proceed as per DPW, with provincial support already received) and Pelham St.	

Infrastructure Review Meeting Minutes	
Details / Discussion Points / Issues Identified	**Recommendation** *(for budget ask)* **/ Action Items** *(tracked via QMS LIST 006)*
south stretch as per MPW; **2023** involves proposed design work for Pelham – Hay and Quaker road cast iron; **2024** Pelham Spruce side after Quaker road and Pelham road will be done in its entirety. It is estimated that cast iron replacement will be complete by 2030/2035 (Emmett St. is scheduled for 2027) • Reviewed **2018-2022YTD break histories** to date as per 'Current Combined Water Ops 2015 onward spreadsheet' 'Watermain Break Summary' tab (with clarification from SWW): – **9** (revised from 2020 meeting) **in total in 2018** (1 pulled by contractor on Hurricane [risk assessment outcome 8]) 2x Pelham St N, 2x Pelham St S, 1 Strathcona Drive, 165 Welland and 1441 Station St. (watermain to be replaced in these areas) and 1 Bacon Lane – **13 in 2019** (5 contractor- and 2 ageing-related, 5 cast iron) – **12 in 2020** (6 contractor-related, 6 cast iron) – **2 in 2021** (due to age / cast iron, no leaks, or contractors [latter are new]) – Numbers confirmed to continue to be in line with 5-10 / year with highest frequency in replacement process which is also dependent on funding/available reserves, wastewater, and roads needs.	
Hydrants – monitoring, servicing, operating & capital needs, other 2021 Hydrants and Q4 Valves with Management Review Action 2020-AI-02 to redefine valves / hydrants quadrants map rescheduled to Fall 2022 (from 2021).	No additional recommendations or action items.
Main valves – monitoring, servicing, operating & capital needs, other • 'Current Combined Water Ops 2015 onward spreadsheet' 'Maintenance Activities' tab identifies **valve maintenance** taking place as above with all quadrants exercised and maintained as per SWW • **Existing Pressure Release Valves (PRVs)** – Region responsibility (e.g., Canboro) identified within the 2022 Operational Plan revisions with Town maintenance as	No additional recommendations or action items. Prv maintenance SOP preventive action

Infrastructure Review Meeting Minutes	
Details / Discussion Points / Issues Identified	**Recommendation** *(for budget ask)* **/ Action Items** *(tracked via QMS LIST 006)*
part of operating budget; last 2 remain to be completed in 2022 with 2 completed in 2021 (9 in total)	
Other appurtenances – operating & capital budget needs, other	No additional recommendations or action items.
• **Bulk Station** (identified with a 50-year life span and installation in 2010) continues to have no short-term concerns / implications to capital request although identified with a 2024 / 2025 replacement in capital budget although it is operating. Backflow testing annually. • MPW identified still halfway through **water meter program** which is also identified in capital in 2034 ($2M project at moment)	
Inventory and Tools – operating & capital needs, other	No additional recommendations or action items.
• No additional requirements since 2 **Colorimeters** (4 in total) were replaced in 2019	
Software / hardware – capital needs, other	
• **Operator software tablets Action (2020-OFI-11)** is rescheduled for 31-Dec-2022 (from Sep-21)	
Pumping Station	No additional recommendations or action items.
• Region attends the site once / month and contacts the Town in the event of an issue, none reported. Although the Region does intend on moving forward with the Water Tower which will obsolete the pumping station (related to Risk Assessment Outcomes #s 1 and 2), it is still in the design stage with property acquisition still in play. 2023 project start will likely be pushed off *(refer to OPEN **2020-OFI-05** 2025 MECP Inspection Recommendation)*.	
Staffing	

Infrastructure Review Summary

Revision #03 Document #QMS FORM 026

Infrastructure Review Meeting Minutes

Details / Discussion Points / Issues Identified	Recommendation *(for budget ask)* / Action Items *(tracked via QMS LIST 006)*
No requirements were identified from a compliment perspective as per DPW although one staff member (off now) will be replaced with CVs currently being reviewed.	No additional recommendations or action items.

Water Quality Complaints

Annual summary in 'Complaint Summary' tab of 'Current Combined Water Ops 2015 onward spreadsheet' was reviewed (none in 2022 to date):

TYPE	2016	2017	2018	2019	2020	2021	TOTAL
Air Complaints / Year – tied to watermain breaks and colour	3	1	1	2	2	-	9
Colour Complaints / Year – internal plumbing issues led to an increase in 2019 (e.g., rusty water tanks)	4	7	3	12	3	7 (due to general flushing or water softeners which can also affect pressure)	36
Leaky Service Complaints / Year – water main replacement has reduced this number	5	22	3	2	5	3 not report on those	40
Low Pressure Complaints / Year – moves from one area to another	9	13	5	8	7	7	49
Odour Complaints / Year	1	2	1	2	1	4	11
TOTAL	22	45	13	26	18	21	145

No additional recommendations or action items.

Best Management Practices (BMPs)

• Although **QMS LIST 006 Corrective Action List** OPEN 2018-OFI-13, 2019-OFI-01 and 2020-OFI-05 OPEN MECP Recommendations were not deemed as BMPs at the last meeting, they are closed except for the latter (rescheduled to 2025)	As per SWW, **2021-BMP-01** GPS equipment for valves / hydrants rescheduled to 31-Dec-2022 from late summer / early Fall

Infrastructure Review Meeting Minutes	
Details / Discussion Points / Issues Identified	**Recommendation** *(for budget ask)* **/ Action Items** *(tracked via QMS LIST 006)*
and verified 16-Nov and 1-Apr respectively; there are no additional Element 14 actions aside from those listed here	

Appendix B - Management Review

Town of Pelham
Form

Management Review Meeting Record

Revision #01 Document #QMS FORM 027

The Corporation of the Town of Pelham Drinking Water Distribution System	
Meeting Location:	Online
Date / Time:	November 17, 2022
Attendees:	Jason Marr (DPW), Ryan Cook (MPW), TGC Facilitator (Sandra Tavares)
Minutes Recorded by:	Sandra Tavares (TGC)
Minutes to be distributed to:	DPW, MPW and Council

Management Review dated 9-Dec-2021 was communicated 22-Feb-2022 via Resolution 8.3.1.

Management Review Minutes are located at 'ops(M:)\Public Works & UTILITIES DEPARTMENT\Water Distribution System\DWQMS\Management Review' by year.

*Please refer to Management Review Data Summary Package dated 9-Dec-2021 for previous details reviewed for each of the inputs below.

Management Review Meeting Minutes *(completion of Action Items to be tracked via QMS LIST 006)*				
Input	**Details / Discussion Points / Issues Identified /Decisions Made**	**Action Item(s)**	**Responsibility**	**Proposed Due Date**
1)	**NO** Incidents of regulatory non-compliance:	Not applicable (N/A)	N/A	N/A
	- Last **MECP Inspection** took place 16-Feb-2022 (=2021 inspection) and 100% was received. - no associated 'Recommendations and Best Management Practices' were identified in 2022 although **QMS LIST 006** **2016-09-01** (backflow which is also addressed in subsequent MECP Inspection Reports is now closed until mandated and **2020-OFI-05** remains to be determined by Region, estimated 2025): i) Town baffles/mixing systems/rechlorination stations installations, impact of higher pressure on older watermains and adjusting Pressure-Reducing Valve (PRV) strategies accordingly, and ii) visiting the new Port Colborne Barrick and King St. Roads and Well and Bemis Elevated Tanks for issues during construction and decommissioning / demolition. Refer to Item 14) below for 2021-BMP-01.			

2)	Incidents of adverse drinking-water tests: - **2-2022 Adverse Water Quality Incidents (AWQIs) Total Coliform (TC) and high residuals**, likely lab error. As per 2022 Internal Audit, to be added to QMS LIST 006 for root cause analysis review. - Previously, **2-2020 TC and high chlorine** 9-Sep (151917, resolved 14-Sep) and 25-Jun (150397, resolved 29-Jun) and **4 incidents in 2015** as per 'Current Combined Water Ops 2015 onward spreadsheet' 'Maintenance Activities' tab. - As per 2022 Internal Audit, new more workable QMS FORM 017 (25-Mar-21) is not being used (part of DWQMS Element 5 Nonconformity)	N/A	N/A	N/A
3)	Deviations from Critical Control Limits and response actions: ***QMS FORM 008 Chlorine Residual Sampling did not identify any deviations.***	N/A	N/A	N/A
4)	The effectiveness of the risk assessment process: • **Re-Assessment** completed 2020-07-14 and to be scheduled for 5-Apr-2023, to include all Operators, Engineering, Asset Management and Public Works as climate representatives, and address new MECP cybersecurity threat • **Annual Review** took place 30-Mar-2022 with QMS LIST 001 'Revision History' tab outlining changes to scoring and one Critical Control Point, Distribution Loss of chlorine residual due to long residence time, remaining	Next proposed 2023 prior to NSF Re-Accreditation and to coincide with 2023 budget process *(refer to QMS LIST 006 'DWQMS Timeline' tab)*	**TGC**	Review **COMPLETED** 30-Mar-2022
5)	Internal / third-party audit results: - Results of the **2022 Internal Audit** (IA) were reviewed with report to be issued by 30-Nov-2022; **5 Opportunities for Improvement** (Elements 5 Document and Records Control, 13 Essential Supplies and Services, 14 Review and Provision of Infrastructure, 15 Infrastructure Maintenance, Rehabilitation and Renewal and 21 Continual Improvement) and **1 Nonconformity** (Element 5) to be added to QMS LIST 006 - **2021 Internal Audit OFIs** pertaining to Elements 6 Drinking Water System, 10 Competencies and 17 Measurement and Recording Equipment Calibration and Maintenance Internal Audit are complete - **Previous Internal Audit findings 2020-OFI-14** pertaining to contractor related breaks was discussed. There were 2 contractor related breaks in 2 years with compaction to be brought up at next Regional meeting 14-Dec-	**Backflow SOP to be developed.**	SWW	Spring 2023

	2022. Due to infrequency and compaction issues around breaks, this item is now closed; **2020-OFI-15** to ensure maintenance forms are completed in their entirety was closed at the 6-Apr-2022 Calibration Session - The **NSF external DWQMS audit** took place 19-Apr-2022 with 1 OFI pertaining to testing of all Emergency procedures every 9 years, despite all being tested at same time 14-Jul-2020; for this reason, this OFI is now closed; all previous findings addressed			
6)	Results of emergency response testing: Last Conducted 14-Jul-2020.	Scheduled for 13-Sep-2023 as per QMS LIST 006 'DWQMS Timeline' tab	N/A	N/A
7)	Operational Performance: • **Sampling results** were presented by SWW for lead (2x/year), and quarterly TriHaloMethane and HaloAceticAcid Running Annual Averages below requirements and latter with a downward trend • **Maintenance** as per 'Current Combined Water Ops 2015 onward spreadsheet' was reviewed: – 2022 **annual valve maintenance**, this year for Quad 1 needs to have confirmation of all valves addressed as per 2022 Internal Audit finding. – **annual hydrant maintenance** (including flushing, greasing, repair if needed) is also completed in 4 Quadrants although in one year (Spring to Fall) – **dead end blow off flushing** is completed in the **Spring** and **Fall**	**2020-AI-01 OPEN to create a procedure for PRV maintenance** *remains OPEN with Devine consultation for frequency as suggested via 2022 Internal Audit* **2020-AI-02 to redefine valves / hydrants quadrants map** *remains OPEN despite maps being updated Apr-2021 as per 2022 Internal Audit* **2020-AI-03 to review Flushing QMS SOP 001 for frequency**	MPW / SWW ***(Reassigned to SWW)*** MPW / SWW ***(Reassigned to SWW)*** **SWW** (reassigned from MPW)	April 2021 ***(postponed to Oct-21 and 31-Dec-2022)*** 1-Sep-2021 ***(postponed to 31-Oct-21 and Fall 2022)*** 1-Sep-2021 ***(postponed to 31-Jan-2022)***

		2022-AI-01 to develop a backflow SOP has been added to QMS LIST 006 as per MPW.	**SWW**	***Spring 2023***
8)	Raw water supply reports & drinking water trends: Region of Niagara reports reviewed annually by MPW identified no issues.	N/A	N/A	N/A
9)	Follow-up on actions from previous Management Reviews: *Refer to Item 7 above and throughout Minutes for additional Management Review Action Items.*	N/A	N/A	N/A
10)	Status of management actions items identified between reviews: Refer to Item 9) directly above.	N/A	N/A	N/A
11)	Changes that could affect the Quality Management System: - **Annual Calibration** completed 6-Apr-2022 and scheduled for 12-Apr-2023 prior to NSF on-site Re-Accreditation (yet to be scheduled for 2023) - A new **maintenance management system** is expected	N/A	N/A	N/A
12)	Consumer feedback (incl. complaints): Annual summary in 'Complaint Summary' tab of 'Current Combined Water Ops 2015 onward spreadsheet' was reviewed:	N/A	N/A	N/A

Complaints / Year	2016	2017	2018	2019	2020	2021	22YTD
Air	3	1	1	2	2	-	-
Colour	4	7	3	12	3	7	1
Leaky Service	5	22	3	2	5	7	-
Low Pressure	9	13	5	8	7	7	3

	<table><tr><td>**Odour Complaints**</td><td>1</td><td>2</td><td>1</td><td>2</td><td>1</td><td>1</td><td>-</td></tr><tr><td>**TOTAL**</td><td>**22**</td><td>**45**</td><td>**13**</td><td>**26**</td><td>**18**</td><td>**22**</td><td>**4**</td></tr></table> Previous increase in odour complaints in 2021 (6 vs. 4 reported during Infrastructure Review and now 1 as per Current Combined) was discussed and 1 was noted as regulatory. Odour to be tracked as part of new maintenance system.			
13)	The resources needed to maintain the QMS: • Number of Operators OK until 2025 when work is required on the system as per KPMG report • 2023 DWQMS Timeline was reviewed, and dates agreed upon as reported throughout these minutes	N/A	N/A	N/A
14)	The result of the infrastructure review: **Infrastructure Review** Meeting took place 30-Mar-2022 *(with no new recommendations or actions)* with updates to the meeting as follows: - cast iron watermain replacement (e.g., Pelham St.) Phase 4 to be completed in 2025 (Spruce and Century 21); 4km watermain in north Fonthill in design phase with completion by 2026 and very little cast iron watermain after that - Clare Avenue Watermain Replacement has not been tendered yet (scheduled for 2023) but design completed as well as Station St. (to be tendered in 2022 before Christmas and to be done in 2023) and partial replacement at MS Park - design for Camber watermain replacement and Pine Crest area (part of $4M grant submission for cast iron) is scheduled for 2026; 2024 Pelham Spruce side after Quaker Road and Pelham Road will be done in its entirety with an estimation that cast iron replacement will be complete by 2030/2035 (Emmett St. is scheduled for 2027) - **2020-OFI-11** pertaining to Work Order Software tablets required for Operators and associated **2021-BMP-01** pertaining to GPS Equipment for valves and hydrants and **2020-AI-02** to redefine valve / hydrants quadrants map is being worked through Asset Management and will take 3-5 years to implement with a process for adding or taking away valves / hydrants; GIS platform and a work order system is in the budget for Q2 2023	N/A	N/A	N/A

<table>
<tr><td>15)</td><td>Operational plan currency, content, and updates (incl. need for re-endorsement):

Operational Plan (OP) and associated QMS PROC updates (some of which have been discussed above) as per QMS LIST 010 were completed in Jan/Feb-2022 where documentation reduced by 19% since 2016 and submitted to Council with no new endorsement by Council needed and 9-Feb-2021 by Top Management. The OP will again be reviewed Jan-2023 with improvements as a result of the 2022 Internal Audit and ahead of new Council endorsement Feb-2023.</td><td>N/A</td><td>N/A</td><td>N/A</td></tr>
<tr><td>16)</td><td>Personnel suggestions:

Tracked via QMS LIST 006 all CLOSED and last raise in 2020.</td><td>N/A</td><td>N/A</td><td>N/A</td></tr>
<tr><td>17)</td><td>General assessment of suitability, adequacy, and effectiveness

QMS LIST 006 Closure Rate of 89% in Apr-2021 TO 92% as of 9-Dec-2021 and 93% as of 6-Apr-2022.
Audits identified the following positive trend:
<table><tr><th></th><th>2015</th><th>2016</th><th>2017</th><th>2018</th><th>2019</th><th>2020</th><th>2021</th><th>2022</th></tr><tr><td>Internal Audit</td><td>3 NCs, 5 OFIs</td><td>5 NCs, 13 OFIs</td><td>8 OFIs</td><td>6 OFIs</td><td>1 NC, 4 OFIs</td><td>5 OFIs</td><td>3 OFIs</td><td>1 NC, 5 OFIs</td></tr><tr><td>MECP Inspection</td><td>2 NCs</td><td>3 Recs</td><td>4 Recs</td><td>3 NCs, 5 Rec</td><td>2 Recs, 2 AIs</td><td>1 NC</td><td>N/A</td><td>0</td></tr><tr><td>External audit (OFIs)</td><td>4</td><td>2</td><td>2</td><td>3</td><td>2</td><td>2</td><td>1</td><td>1</td></tr><tr><td>TOTAL</td><td>5 NCs, 9OFIs</td><td>5 NCs, 18 OFIs</td><td>14 OFIs</td><td>3NCs, 14 OFIs</td><td>1 NC, 10 OFIs</td><td>1 NC7 6 OFIs</td><td>4 OFIs</td><td>1NC, 5 OFIs</td></tr></table>Most findings are generated from internal audits and mostly OFIs. Corrective and preventive actions are being managed effectively. The QMS is deemed to be suitable, adequate, and effective.</td><td>N/A</td><td>N/A</td><td>N/A</td></tr>
<tr><td>18)</td><td>Review and consideration of applicable Best Management Practices (BMPs)

MECP website identified no BMPs but would be included within QMS LIST 006 if identified from this or other source – no additional BMPs to the one identified in item 14) above was identified by DPW or MPW.</td><td>N/A</td><td>N/A</td><td>N/A</td></tr>
</table>

Appendix C – Internal QMS Audit

The Corporation of the Town of Pelham

Drinking Water Quality Management System (v2)
Internal Audit Report

20 Pelham Town Square
P.O. Box 400
Fonthill ON, L0S 1E0

Virtual Internal Audit Dates:	16/17 November 2022
Report Distribution:	Ryan Cook, *Manager of Public Works* (MPW) Jason Marr, *Director of Public Works* (DPW)

Sandra Tavares, *B.Sc., M.Sc., EP(EMSLA), EP-Sustainability*

Report Issued: 30 November 2022

tavares
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Project Objectives

Tavares Group Consulting Inc. was engaged by The Town of Pelham to conduct an Internal Audit of the Town's Drinking Water Quality Management System (QMS) against the Drinking Water Quality Management Standard (DWQMS V2). This audit was conducted to satisfy the requirements of the DWQMS Element 19 requirement to complete a QMS internal audit at least once every calendar year. Please see Annex A for auditor qualifications.

Project Scope

An onsite audit was performed 16/17-Nov-2022 according to ISO 19011:2018 Guidelines for auditing management systems, including the Internal Audit Plan issued 4-Oct-2022 to confirm:

- the QMS conforms with the applicable elements of the DWQMS; and
- Corporation of the Town of Pelham conforms with its own policies and procedures.

Results of prior internal and external audits were also considered and reviewed through the course of the audit.

An Opening Meeting was held 16-Nov-2022 with the Manager of Public Works and Supervisor Water / Wastewater (SWW) with a Closing Meeting 17-Dec-2022 during Management Review and including the Director of Public Works (all interviewees).

Conclusions

The Town of Pelham's QMS conforms with:

- the applicable elements of the DWQMS, and
- its own policies and procedures.

The Operating Authority's (OA) commitment to the improvement of its QMS is evident and has the appropriate elements in place for further improvement.

In total, there was one [1] Nonconformity and four [4] Opportunities for Improvement (OFIs) identified. Refer throughout the audit report for previous audit finding follow-up *(details regarding closure and verification can be found in QMS LIST 006)*. A Summary of Findings has been provided below with details in the Comments portion of the report; identification numbers (e.g., 2022-IA-OFI/NC-XX) have been assigned for new findings.

2015 – 3 NCs, 5 OFIs
2016 – 5 NCs, 13 OFIs
2017 – 8 OFIs
2018 – 6 OFIs
2019 – 1 NC, 4 OFIs
2020 – 5 OFIs
2021 – 3 OFIs
2022 – 1 NC, 4 OFIs

Confidentiality

This report was prepared exclusively for The Corporation of the Town of Pelham and is based on information collected during off- and on-site reviews. The scope of the project is described in this report and is subject to restrictions, assumptions, and limitations. As noted herein, the work was conducted in accordance with the scope of Tavares Group Consulting's proposal and Terms and Conditions.

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Summary of Findings

Owner (& Operating Authority):	The Corporation of the Town of Pelham (Public Works)
Auditors:	Sandra Tavares *(Lead)* and Francis Chua *(Team Member)*
System Reviewed:	Pelham Distribution System (PDS)

REQUIREMENT ↓	FINDING(S) ↓
1. Quality Management System	C
2. Quality Management System Policy	C
3. Commitment and Endorsement	C
4. Quality Management System Representative	C
5. Document and Records Control	2022-IA-NC-01, -OFI-01 *OFI 2020-IA-01* ***COMPLETE***
6. Drinking Water System	*OFI-2021-IA-01* ***COMPLETE***
7. Risk Assessment	C
8. Risk Assessment Outcomes	C
9. Organizational Structure, Roles, Responsibilities and Authorities	C
10. Competencies	*OFI-2021-IA-02* ***COMPLETE***
11. Personnel Coverage	C
12. Communication	C
13. Essential Supplies and Services	2022-IA-OFI-02 *OFI 2020-IA-03 continues to be* ***ON HOLD***
14. Review and Provision of Infrastructure	2022-IA-OFI-03
15. Infrastructure Maintenance, Rehabilitation and Renewal	2022-IA-OFI-04
16. Sampling, Testing and Monitoring	C
17. Measurement and Recording Equipment Calibration and Maintenance	*OFI-2021-IA-03* ***COMPLETE***
18. Emergency Management	C
19. Internal Audits	C
20. Management Review	C
21. Continual Improvement	2022-IA-OFI-05

C	Conforms to the requirement – See comments in body of report
NC	Non-conformity
OFI	Opportunity for improvement – See Annex A
OFI *	Opportunity for improvement which may become a nonconformity if not addressed– See Annex A

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Comments

DWQMS Reference	1. Quality Management System
Evidence	Pelham Distribution System (PDS) Operational Plan (Rev.14, 23-Feb-2022)
Finding	Conforms
Summary	The Pelham Distribution System Operational Plan (OP), now available online at https://www.pelham.ca/en/living-here/water-and-wastewater-maintenance.aspx (with the QMS Policy) addressing OFI 2020-IA-01 iii, documents and is implementing a Quality Management System (QMS) that meets the requirements of the DWQMS. The OP was recently revised to add regulatory hyperlinks to Element 1 and overall streamlined to eliminate duplication, such as the References section, and points to applicable procedures throughout.

DWQMS Reference	2. Quality Management System Policy
Evidence	PDS OP Element 2 (Rev.14, 23-Feb-2022), S801-01 (Council Approval date of 22-Mar-2021 and OA sign-off 2-Mar-2021)
Finding	Conforms
Summary	Public Works, as the OA, has established and maintains a QMS Policy documented within S801-01, recently revised for conciseness, signed by the DPW and MPW 2-Mar-2021, and approved by Council 22-Mar-2021 via agenda number 10.2.6, sets the foundation for the QMS and meets the requirements of the DWQMS. The Policy is posted at the Town of Pelham Operations Centre, available for viewing at the Town of Pelham Municipal Offices and communicated to the Public through the Town's website as per Element 1 directly above and is available upon request. As per QMS PROC 021, it was last communicated to Purchasing Policy Essential Suppliers 14-Apr-2022 via email to Wolseley, Emco, Evans, Niagara industrial and Vancor (equipment), Flowmetrix and Hach (calibration), Cleartech (calibration equipment), and Devine (Pressure Reducing Valve [PRV] maintenance).

DWQMS Reference	3. Commitment and Endorsement
Evidence	PDS OP Element 3
Finding	Conforms
Summary	Endorsement of the QMS Policy, the OP (now included in OP Appendix A to address OFI 2020-IA-01 iv) and approval of the Financial Plan ***(refer to Element 14 2022-IA-OFI-03)*** was completed by Council as per Element 2 directly above (although minor updates to the OP do not require Owner re-endorsement) with the former endorsed by OA Top Management (i.e., DPW and MPW) most recently 9-Feb-2021. Top Management has provided evidence of its commitment by:

i. ensuring a QMS is in place that meets the requirements of the DWQMS *(see Element 1)*;
ii. communicating the QMS *(see Element 12)*;
iii. determining, obtaining, and providing the resources needed to maintain and continually improve the QMS *(see Element 20)*; and

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iv. ensuring the OA is aware of applicable regulatory requirements which since the last internal audit include the **cybersecurity MECP Potential Risk** *(refer to Element 7)*. As confirmed via interview with the MPW, potential changes continue to be communicated to OA Top Management through the MECP Inspector, e-mails from the Ontario Municipal Water Association (OMWA) and Municipal Water and Wastewater Regulatory Committee (MWWRC) although the Region of Niagara Municipal QMS/Compliance Working Group is mostly relied upon; PDS Element 3 was recently revised to reflect this process with MPW identification responsibility, and associated communication of changes.

DWQMS Reference: **4. Quality Management System Representative**

Evidence: PDS OP Element 4

Finding: **Conforms**)

Summary: The QMS Representative is identified within the OP as the MPW, appointed via a Memorandum of Understanding (MoU) issued by the Public Works Department – Engineering 15-Dec-2015 and approved via by-law, as per OP Appendix B (to address OFI 2020-IA-01 iv). Responsibilities (described under Element 9 and confirmed during the audit) include:

i. administering the QMS by ensuring that processes and procedures needed for the QMS are established and maintained *(see Element 1)*;
ii. reporting to Top Management on QMS performance *(see Element 20)*;
iii. ensuring that current versions of documents are being used *(see Element 5)*; and
iv. ensuring that personnel are aware of applicable regulatory requirements and the QMS *(refer to Elements 3, 10 and 12)*.

DWQMS Reference: **5. Document and Records Control**

Evidence: PDS OP Element 5, QMS PROC 005 (rev.11, 30-Mar-2022), QMS LIST 010 Document Management List (rev.3, 14-Feb-2018; last updated 30-Mar-2022)

Summary: QMS PROC 005, recently revised to hyperlink to Director's Directions and O.Regs.128 and 170, reference verification records, Chains of Custody retention as per QMS PROC 016 duplication and obsolete retention requirements within QMS LIST 010, eliminate 'Utilities' from references to Public Works titles, and update hardware device and daily incremental back up times, also identifies the remainder of the document and records control process that includes how documents are kept current through creation and revision, and documents and records remain legible and identifiable, and are retrieved, stored, retained, and disposed of. Record filing and disposal is also addressed, and where applicable as per 3900-2017 - Records Retention By-law and Amendment 3-Apr-2018 S203-04 which enacts the regularly updated Records Retention Schedule/Citation Table #03-01-04 (2022-07, ***refer to*** *2022-IA-OFI-01*) which includes water records. PDS' QMS documentation includes the OP and associated procedures (PROC-level), Standard Operating Procedures (SOPs), FORMs and LISTs, some of which were confirmed and summarized throughout this audit report. QMS LIST 010 identifies QMS documentation by name,

revision number, date, controlled copy location, and, for forms, change history; most current OP documents were observed to be maintained in the shared drive ('Public Works & Utilities Department\Water Distribution System\DWQMS\Operational Plan Procedures SOPs Forms' still accessed by the MPW, DPW, Engineering and Supervisors) with the MPW responsible for electronic and Operations Centre and Town Hall updates with the assistance of the Administrative Assistant. Infrastructure review, internal audit and Management Review records date back to 2010 with obsolete documentation such as previous OPs dating back to 2009, still located at 'DWQMS/Obsolete Documents'.

Finding: *Nonconformity 2022-IA-NC-01.*

Details: Document and record control processes are not consistently followed:

i. Current documents are not being used, e.g., Adverse Water Quality Incident (AWQI) QMS FORM 017 not completed for 2022 incidents and Hydrant Maintenance and Inspection QMS FORM 002 (rev.05) completed monthly in 2022 despite rev.6 being most recent, QMS FORM 008 Chlorine Residual Sampling.
ii. Ensure record control and traceability (e.g., QMS FORM 014 Watermain Valve Maintenance and Inspection Form 'Condition and Operation' sections left blank, Dec-2021 Watermain Break QMS FORM 025 (rev.08) was not reviewed by MPW and 4 Category 1s Jan-2022 showed no sign off on scanned copy). .

Finding: *Opportunity for Improvement 2022-IA-OFI-01.*

Details: There is an opportunity to:

i. clarify management of external documents within update QMS PROC 005 (e.g., source, 3900-2017 - Records Retention By-law and associated Records Retention Schedule/Citation Table #03-01-04 reference [i.e., 2022-07] and its electronic location, Procurement Policy 3250 (2012) availability at 'top2\A09 – Policies & Procedures\Corporate Services\Purchasing Policies', Town of Pelham Emergency Management Plan adopted by Town Council By-Law 4489-2022 located at 'Public Works\P03 – Emergency Planning & Response\Emergency Response Plan' folder).
ii. update QMS PROC 007 reference to MECP's Potential Hazardous Events for Municipal Residential Drinking Water Systems to Consider in the DWQMS Risk Assessment (Feb-2017 and Apr-2022).
iii. review tracking of maintenance completion (e.g., Valve Maintenance and associated Apr-2021 quadrant maps) as a focus for 2023 DWQMS Improvements.

DWQMS Reference: 6. Drinking Water System

Evidence: PDS OP Element 6

Finding: Conforms

Summary: A description of the Class 2 Water Distribution System has been documented within OP Element 6, owned by the Corporation of the Township of Pelham, and operated by the Public Works Department and as per the most recent revision, updated in line with annual Engineering inventory and metering

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program updates to address 2021-OFI-18 (OFI-2021-IA-01). PDS receives treated drinking water from the Welland Water Treatment Plant, owned and operated by the Regional Municipality of Niagara which is relied upon to ensure the provision of safe drinking water. The subject system's components include, as per Engineering's 2021 annual inventory update:

- approximately 86 Km of water main,
- 569 fire hydrants,
- 683 town owned valves,
- 5373 service connections,
- 9 PRVs (as part of Operational Manual, 2 PRVs are operated by the Region of Niagara and 7 by PDS; maintenance conducted at Brock 30-Aug-2021 via Water / Wastewater Work Order (WO) completed by Devine ***[refer to 2022-IA-OFI-03]*** and 28-Oct-2020 at Churchill; SOP needs to be developed [2020-AI-01 scheduled for 31-Dec-2022]), and
- a pressure boosting station (serving Chestnut Ridge with maintenance and operation contracted to the Region of Niagara and observed completed as per EAM Maintenance Records 1-Jan through 31-Dec-2021 dating back to 2015, 2016 missing).

A description of the water source and treatment process has been documented, in addition to a process flow chart. The subject system is also connected to the Welland Distribution System (owned and operated by the City of Welland) via 3 connections (valves have been closed since 1970). The Town of Pelham maintains disinfection residuals through the flushing program – *refer to Element 15 for more details*. There are no common event-driven fluctuations or resulting operational challenges or threats concerning the water source.

DWQMS Reference	7. Risk Assessment
Evidence	QMS PROC 007 (rev.9, 11-Nov-2019), QMS LIST 001 Risk Assessment Outcomes List (rev. 4, 30-May-2022 [Review])
Finding	Conforms
Summary	QMS PROC 007 documents a risk assessment process that includes consideration of potential hazardous events and associated hazards, as identified in MECP's Potential Hazardous Events for Municipal Residential Drinking Water Systems to Consider in the DWQMS Risk Assessment ***(refer to 2022-IA-OFI-01 ii)***. Hazards and associated events are ranked based on likelihood, consequence, and detectability, with those meeting the threshold of 7 and higher identified as Critical Control Points (CCPs). A risk review or re-assessment may also be conducted if significant changes occur within the DWS (e.g., change in size or scope of the system, addition of new infrastructure). The annual review was most recently completed on 30-Mar-2022 (previously 25-Mar-2021); there were no changes identified/required to CCP threshold or QMS PROC 007 consistent with no changes to the distribution system or modifications to existing processes since the previous assessment/review. The Risk Assessment History details the discussions, and the Risk Assessment Results identifies the recent changes (i.e., Risks #3 Distribution Loss of chlorine residual due to long residence time and #11 Distribution Backflow from plumbing connection or illegal hydrant use). As per the Management Review Meeting

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Record (9-Dec-2021) regarding the effectiveness of the risk assessment process: "Annual Review resulted in no changes and took place with Review of Infrastructure" and as per the 17-Nov-2022 Management Review, the 13-Apr-2022 MECP cybersecurity threat is to be part of the next Risk Outcomes Re-Assessment 5-Apr-2023.

DWQMS Reference	8. Risk Assessment Outcomes
Evidence	QMS PROC 007, QMS LIST 001 Risk Assessment Outcomes List, QMS SOP 001 (rev.6, 26-May-2017)
Finding	Conforms
Summary	QMS LIST 001 demonstrates implementation of a risk assessment that is consistent with QMS PROC 007. MECP hazards such as chemical spill impacting source water is addressed in an evergreen Memorandum of Understanding (MoU, located at 'Ops:\Public Works\Niagara Region and NPCA\Memorandums of Understanding\final versions' signed) dated 21-Apr-2016 with the Regional Municipality of Niagara (no proposed changes identified as per MPW; 2017 Water / Wastewater Master Plan will require revision when the tower comes down which has not been determined at this time) and signed by the former DPW, with no incidences reported. One voluntary CCP has been identified related to loss of chlorine residual due to long residence time (CCL = 0.20 mg/L). Flushing measures to restore residual is documented as per QMS SOP 001 *(refer to Element 6)*. As confirmed via QMS LIST 006, the last deviation from the identified CCL took place 11-Jun-2020 as per 2021-NC-01. Response, reporting, and recording processes in the event of a deviation from the identified CCL have been documented within QMS PROC 016 *(refer to Element 16)*. As per QMS FORM 026, the risk assessment outcomes were reviewed at the Infrastructure Review; no additional recommendations or actions were required and there are no current implications to the capital request.

DWQMS Reference	9. Organizational Structure, Roles, Responsibilities and Authorities
Evidence	PDS OP Element 9
Finding	Conforms
Summary	OP Element 9 describes the OA organizational structure including respective roles, responsibilities and authorities which were reviewed during the onsite audit; Figure 3 Organizational Chart for water system relevant personnel identifies all relevant Public Works personnel with no changes noted, confirmed by the MPW. Top Management, as per Element 3 above, continues to be involved in Infrastructure and Management Reviews, with the DPW having weekly regular informal DWQMS communication with the MPW. The SWW is responsible for ensuring maintenance is conducted and documented (e.g., 'Current Combined Water Ops 2015 onward spreadsheet') as reviewed. Operators respond to watermain breaks and conduct maintenance, etc.

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DWQMS Reference	10. Competencies
Evidence	PDS OP Element 10), Operator Training Summaries
Finding	Conforms
Summary	OP Element 10 documents the required competencies of personnel whose duties directly affect drinking water quality. Regular training is provided and can take place off-site, On-the-Job, or electronically. QMS Awareness training is provided to new operations personnel where the OP is reviewed and covers relevance of duties although no new Operators have been hired since the last audit, as per the SWW. Operator certificates were current and still posted at the Tice Road Operations Centre by Meeting / Lunchroom. Updated Operator Training Summaries to partially address OFI-2021-IA-02 to update with current certificate numbers (although still not tracking whether training is online or in-person) are in place by name and tab related to the certificate duration, signed off by the DPW prior to submission for Operator re-certification, located at 'Ops:\Public Works\Water Distribution System\DWQMS\Training Records' (presentations) and '…\Water Distribution System\Operator Training Records' by name. The following records were reviewed: • S. Berstling Class 1 #58758 exp.28-Feb-2023 *(returned 16-Nov-2022)* • R. Cook Class 2 #16368 exp.31-Mar-2023 • D. Nicholls (non-certified Supervisor exp.31-Oct-2022) with Mandatory Renewal Course 11-Apr-2022, and Mueller hydrant training 11-Apr-2022 with BS and MP • M. Paniccia *(most recent 2019 hire)* exp.31-Dec-2023 • B. Smith exp.28-Feb-2023 with Walkerton Clean Water Centre (WCWC) 20-Mar-2022 Mandatory Renewal Course (SWW 21-Mar-2022 with MPW), Wolseley Day 13-Dec-2021 on hydrants, lead, etc. with SWW, MP and MPW • SWW Class 2 #71210 exp.31-Jan-2023 WCWC 29-Sep-2022 Operation Small Drinking Water Systems

DWQMS Reference	11. Personnel Coverage
Evidence	PDS OP Element 11, QMS PROC 011 (rev.9, 30-Mar-2022)
Finding	Conforms
Summary	OP Element 11, recently revised to reflect deletion of QMS SOP 004 Overtime Call-In, documents a process to ensure that sufficient personnel meeting the identified competencies outlined in Element 10 directly above are available for duties that directly affect drinking water quality. The Town has an after normal working hours emergency telephone number which is still serviced by a Call Centre which will contact designated On Call Personnel. Overall Responsible Operator (ORO, i.e., MPW as per QMS PROC 011, also recently revised to incorporate now deleted QMS SOP 004 Overtime Call-In Procedure and reference the Collective Agreement which determines who will be called) designation is documented via email for holidays backup and observed from MPW 2-7-2022 (for 8-14 Feb-2022) and for 8-3-2022 dated 2-Aug to the PW Administrative Assistant, Operator-In-Charge (OIC, first to respond to after hours call) and DPW. After hours calls, approximately once / month, generally still involve water main breaks, service leaks, and emergency shut offs, with call outs documented in the respective form (i.e., watermain breaks or WO), Water

Distribution System Operation Record / Logbook or On-Call log as per MPW. 3-2021 frozen services were noted (1 unscheduled and 2 scheduled leading to the removal of the similarly titled column in the 'Current Combined…' spreadsheet by the MPW; no other since).

DWQMS Reference

12. Communication

Evidence

PDS OP Element 12, QMS PROC 021 (rev.10), QMS SOP 016 Consumer Complaints (rev.7, both 17-Feb-2022), DWQMS Awareness Training (6-Apr-2022)

Finding

Conforms

Summary

QMS PROC 021, recently revised to eliminate duplication and to reference QMS PROC 014, documents a process that involves communication of the QMS Policy *(refer to Element 2 above)* and how **Top Management** communicates to the **Owner**, e.g.:

- **Committee and Council meetings** *(refer to Element 3 above)*, which includes the results of the annual **Management Review** *(refer to Element 20)*
- **Annual Water Quality Reports** (e.g., 2021 available online [dating back to 2015] through Water and Wastewater Maintenance - Town of Pelham),
- **Infrastructure Review** *(refer to Element 14 below)*.

On-the-job instructions related to changes to the QMS are communicated to **OA personnel** during tailgate talks (Awareness presentation completed 6-Apr-2022 which incorporated all documentation changes, including record control issues) and may be documented via QMS FORM 016 *(refer to Element 10 above)*.

Public water concerns / complaints are managed as per QMS SOP 016, recently revised to clarify receipt of water complaint (e.g., observed via WO or email) and remove reference to PSR, with details tracked on the 'Current Combined Water Ops 2015 onward spreadsheet' 'Complaint Summary' tab which identifies the following:

Complaints / Year	2016	2017	2018	2019	2020	2021	YTD 2022
Air	3	1	1	2	2	-	-
Colour	4	7	3	12	3	7 (construction)	1
Leaky Service	5	22	3	2	5	7 (age, not always)	-
Low Pressure	9	13	5	8	7	7	3
Odour	1	2	1	2	1	1	-
TOTAL	22	45	13	26	18	22	4

Previous increase in odour complaints in 2021 (6 vs. 4 reported during Infrastructure Review and now 1 as per Current Combined) was discussed and 1 was noted as regulatory. Colour in 2021 due to general flushing or water softeners which can also affect pressure. Communication with **Suppliers** is done according to QMS PROC 013 as per Element 2 and QMS LIST 006 'DWQMS Timeline' tab. Letters to Residents are issued pertaining to water related activities (3 in 2022 for interruption of water supply).

DWQMS Reference	13. Essential Supplies and Services
Evidence	PDS OP Element, QMS PROC 013 (rev.10, 26-Jan-2021)
Summary	QMS PROC 013 documents a process by which the OA lists and ensures the quality (e.g., NSF/ANSI, AWWA, CALA) of essential supplies and services *(refer to Element 12 above for the most recent communication)*. OA personnel are responsible for inspecting all received supplies to confirm identified requirements. The following quality requirements were verified with the SWW/MPW: • Anchem Anchlor 12 sodium hypochlorite 10L jug on maintenance garage shelving included NSF/ANSI/CAN 61 mark. • AWWA was confirmed as per email communication to suppliers for Cambridge brass fittings and curbstop on website observed Cambridge brass. Engineering design manual not on website with Nov-2017 Section 5 design requirements (e.g., AWWA, ANSI/NSF 61, no lead for valves, chambers, main) provided to contractors still in effect and located at 'Public Works\Engineering Design Standards Development\Final for Council Dec 2017'. Equipment lead free marking was observed in storage. Procurement Policy 3250 dated 12-Mar-2012 offers no specific quality requirements but highlights the tendering process. • CALA Directory of Laboratories Memberships 3086 for E3 Laboratories Inc. was confirmed valid to 8-Sep-2023 (2728 Caduceon Environmental Laboratories listed for inorganic and microbiological sampling is not used as per SWW) and 1003149 ALS exp.17-Feb-2024 for organic and inorganic testing.
Finding	Opportunity for improvement 2022-IA-OFI-02
Details	There is an opportunity to, within QMS PROC 013: i. reference the Niagara Region Water-Wastewater Project Design Manual (Niagara Region and NPCA folder) and the Ontario Provincial Standard Specifications. ii. document confirmation of capital project drinking water quality requirements (e.g., Ontario Construction Act Form 9).
DWQMS Reference	14. Review and Provision of Infrastructure
Evidence	PDS OP Element 14, QMS PROC 014 (rev.11, 18-Feb-2022), QMS FORM 026 Infrastructure Review Summary (rev.03, 29-Jan-2021) dated 30-Mar-2022
Summary	QMS PROC 014, recently revised to remove 'Utilities' from DPW title and to add the SWW to the process, addresses proposed needs being identified via Infrastructure Review Team meeting once per calendar year to review the previous year's operational history (including but not limited to watermain break history, unplanned maintenance activities, existing water quality issues, etc.), results of the risk assessment and proposed infrastructure rehabilitation plans as identified in the existing 20-Year Capital forecast, as per QMS FORM 026, lastly completed 30-Mar-2022. Any updates to the Forecast as a result of the infrastructure review are reported to the Senior Management Team, led by the Chief Administrative Officer, for review and approval as part of the annual budget process before being presented to Council for approval with removed budgetary requests considered in future years. The outcomes of the risk

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assessment (12-month annual) were reviewed and documented in the Infrastructure Review Summary with no implications to the capital request. In addition, the Infrastructure Review Summary included a review of Best Management Practices resulting in 2021-BMP-01 on GPS equipment for valves / hydrants being added to QMS LIST 006. 2020-OFI-11 identified during the Infrastructure Review (14-Jul-2020) pertaining to WO software tablets required for Operators is an action item in progress with a revised due date of 31-Dec-2022.

Finding Details	Opportunity for Improvement 2022-IA-OFI-03 There is an opportunity to ensure the latest version of the Financial Plan is available online at https://www.pelham.ca/en/living-here/water-and-wastewater-maintenance.aspx; 2014-2020 version is currently listed.
DWQMS Reference	15. Infrastructure Maintenance, Rehabilitation and Renewal
Evidence	PDS OP Element 15, Current Combined Water operations 2015-onward Spreadsheet (current to 15-Nov-2022)
Summary	OP Element 15, recently revised to reflect maintenance SOPs, associated frequencies and 'Infrastructure Maintenance' Annual Works Plan, also documents a summary of the OA's infrastructure maintenance, rehabilitation, and renewal programs. Key infrastructure maintenance and repairs are summarized within 'Current Combined Water Ops 2015 onward' spreadsheet in 'Maintenance Activities (2)' tab up to 15-Nov-2022:

- although **Valve** Maintenance is no longer tracked here for 2022 Quad 1 (via hardcopy QMS FORM 014 Watermain Valve Maintenance and Inspection Form [rev.06]***, refer to Element 5 2022-IA-OFI-01 iii***), it took place from 5-May through 10-Dec-2020 for Quad 3, 4-Jan- through 2-Nov-2021 for Quad 4 (mainly July-Aug); each Quad is completed annually with all done in 4 years
- **Annual Hydrant** Maintenance is documented on Hydrant Maintenance and Inspection QMS FORM 002 (rev.06) completed for each hydrant in hardcopy file by Quadrant, signed off by SWW, and Logbooks; Fire Hydrant Inventory Apr-2021 for Quads 1-4 is available at 'wds\system maintenance summaries\Hydrant Maintenance\Hydrant inventory'
- 2 **watermain breaks** were captured on newly revised QMS FORM 025 (rev.08) Dec-2021 and 4 Cat 1s in 2022 January ***(refer to Element 5 2022-IA-OFI-01 iii)*** and Apr/May which is sometimes leaky service or connection that must be reported on form, construction is not counted, as per MPW
- dead end **flushing** is documented for 2022 in spreadsheet for Spring April-May and Fall in progress and documented on FORM 001 (rev.05).
- 2 **watermain commissioning** 93 Merritt (Contractor Plan QMS FORM 010 [rev.03] completed 15-Apr-2022, BackFlow Prevention Assembly Testing and Inspection Report QMS FORM 006 [rev.02] and Town Checklist FORM 012 [rev.06] both completed 25-Apr) and Park Lane (15-Feb-2022 Town and 28-Jan-2022 Contractor)

The maintenance program is communicated to the Owner through the budgeting process and the Annual Report. The SWW still retains responsibility

for issuing daily WOs and tasks to OA personnel and the electronic logbooks are being considered for easier tracking.

Finding Details:	Opportunity for Improvement 2022-IA-OFI-04 There is an opportunity to: i. ensure all valves have been addressed as part of the maintenance program. ii. review PRV maintenance frequency with Devine and document in OP Element 15 *(to assist with 2020-AI-01)*. iii. remove reference to Portable Analog Pressure Gauges within OP Element 15 and QMS PROC 017 as they are no longer used.
DWQMS Reference	16. Sampling, Testing and Monitoring
Evidence	PDS OP Element 16, QMS PROC 016 (rev.12, 30-Mar-2022), SOPs 010 THMs (rev.9, 8-Feb-2022), QMS FORM 005 Drinking Water Advisory (DWA), Including Boiling Water (rev.1, 18-Feb-2022)
Finding Summary	Conforms QMS PROC 016 was recently revised to eliminate duplication (e.g., lab accreditation requirements, referenced QMS PROC 005 in relation to recordkeeping) and 'Utilities' from Public Works titles, incorporate hyperlinks to Ministry documents, delete QMS SOP 006 sampling requirements, QMS SOP 008 Operational Checks, and QMS LIST 003 (latter incorporated into NEW Appendix with revisions to Weeks #1, 1.6 area and 1.11 location, #2 2.11 and #3 3.12 locations, quarterly HAA location), and update reference to QMS FORM 017. In the event of an adverse result (e.g., as per 'WDS\System Maintenance Summaries\Operations Maintenance Summary\2022\Adverse', 2 with Forms 2A and 2B complete, likely lab error ***(refer to Element 5 2022-IA-NC-01 and Element 21 2022-IA-OFI-04)***. Upstream testing, sampling, and monitoring is described; source water is tested for turbidity, pH, and temperature; no additional testing was conducted at the Shoalts Drive Reservoir for chlorine residual prior to the discharge of water to PDS as per SWW. The program is communicated to Council through mandatory annual MECP reports available at https://www.pelham.ca/en/living-here/water-and-wastewater-maintenance.aspx (including 2021). **Semi-annual lead and alkalinity** took place 6-Oct-2022 and 10-Mar-2022 as per 'Current Combined Water Ops 2015 onward spreadsheet' with results dating back to 2017; 'THM RAA' and 'HAA RAA' tabs identify 8-Mar-, 14-Jun- and 20-Sep-2022 sampling as well as 21-Dec-2021 (trends were discussed during 2022 Management Review). QMS SOP 010 was recently updated to merge with now obsoleted QMS SOP 019 HAA as same process, to reference QMS PROC 016 to minimize duplication including 'Sampling Pickup' and revise hardcopy records location (observed Tice Road upstairs with binders dating back to 2016 and boxes to 2003). Electronic records are located in 'WDS\Water Quality\Water Distribution Sample Results' by year dating back to 2016.

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DWQMS Reference	17. Measurement & Recording Equipment Calibration and Maintenance
Evidence	PDS OP Element 17, QMS PROC 017 (rev.12, 23-Feb-2022), SCG Flowmetrix Water Quality Instrument Verification / Calibration Report 28-Jan-2022 (Statement of Qualifications 2020)
Finding	Conforms
Summary	QMS PROC 017, recently revised to add 'Definitions' Section and references to 'verification' throughout and qualifications in QMS PROC 013, attribute 'Scheduling of Calibration and Maintenance' to SWW from MPW and remove references to number of Pocket Colorimeters, maintenance / calibration frequency (latter in OP Element 15), TELOG Hydrant Pressure Recorder as it is no longer used, pH annual replacement. The following were confirmed on the SCG Flowmetrix Water Quality Instrument Verification / Calibration Report dated Jan-2022: • annual external 4 **pocket colorimeters** calibration (internal verifications are completed via Water / Wastewater WO Form, e.g., 24-Apr-2022). OFI-2021-IA-03 to ensure calibration stickers are consistently updated on handhelds is now complete with an effectiveness check date of 25-Feb-2022 and verification details noted in QMS LIST 006; stickers were observed for #s 2-4 dated 20-Jan-2022 (other truck away). • annual external **HR Colorimeter** FOO92701 • **backflow WATTS** SN 410544 and 12200226 pH meters are purchased annually to ensure certification / calibration.
DWQMS Reference	18. Emergency Management
Evidence	PDS OP Element 18, QMS LIST 002 Emergency Contacts (rev.5, 30-Mar-2022), QMS PROC 018 Emergency Management (rev.6), QMS PROC 025 Watermain Break (rev.10), QMS FORM 005 Drinking Water Advisory (rev.1, all 18-Feb-2022), Town of Pelham Emergency Management Plan 4489-2022, QMS SOP 020 Frozen Service Response (rev.2, 23-Feb-2022)
Finding	Conforms
Summary	A list of potential emergency situations have been documented in QMS PROC 018 (i.e., distribution system contamination, watermain break, and water quality advisory), recently revised to eliminate 'Utilities' from DPW role and includes the Town of Pelham's adopted By-Law #4179 (2019) enacting the Town of Pelham Emergency Response Plan which in turn references QMS-PROC-018 and communication addresses water disruptions and Emergency Operations Centre Functions which includes Operations / Public Works; other relevant emergency procedures pertain to Region and in 'Public Works\Niagara region and NPCA\Emergency response procedures'. Emergency Response Exercises are conducted every 3 years, lastly in 2020 and scheduled for 2023 as per QMS LIST 'DWQMS Timeline' tab. An emergency contact list is documented within QMS LIST 002. QMS SOP 020 was recently revised to reflect deletion of QMS SOP 004 Overtime Call-In Procedure and associated reference of QMS PROC 011 and referenced QMS SOP 017.

DWQMS Reference	19. Internal Audits
Evidence	PDS OP Element 19, QMS PROC 019 (rev.8, 9-Oct-2018), 2021 Internal DWQMS Audit Report (Audit Date 16-Nov and 2/9-Dec-2021, Report Date 16-Dec-2021)
Finding	Conforms
Summary	QMS PROC 019 documents an internal audit process that includes addressing criteria, frequency, scope, methodology and record-keeping requirements, consideration of previous internal and external audit results, and describes how Corrective Actions are identified and initiated (e.g., QMS LIST 006 Corrective and Preventive Actions List). Internal audits have been completed annually (16-Nov and 2/9-Dec-2021, 5-Nov-2020, 25-Nov-2019, 29-Nov-2018 and 27-Nov-2017 by various Tavares Group Consulting Inc. auditors to ensure independence from the activity being audited) with all Elements of the DWQMS (both PLAN and DO sections) subject to audit. Previous internal and external audit findings were reviewed as per QMS LIST 006: • The status of the remaining 5-Nov-2020 internal audit OFI is outlined on the Audit Summary page of this report and addressed in Element 13 above. • 3 OFIs that were identified in the Nov/Dec 2021 internal audit have been updated throughout the audit summary and complete. • 2022-OFI-21 external audit OFI pertaining to Element 18 test as all Emergency SOPs were tested.

DWQMS Reference	20. Management Review
Evidence	PDS OP Element 20, QMS PROC 020 (rev.8, 9-Oct-2018), QMS FORM 027 Management Review Meeting Record (rev.01) dated 9-Dec-2021
Finding	Conforms
Summary	QMS PROC 020 documents a process for Management Review that incorporates the review and consideration of applicable Best Management Practices (BMPs), as required in DWQMS Element 21; 2021-BMP-01 is IN PROGRESS for GPS equipment for valves/hydrants with a due date of 31-Dec-2022 (rescheduled from Sep-2021) as per QMS LIST 006. Management Review was last completed 9-Dec-2021 with the results communicated to the Owner via the Annual Summary Report (O. Reg. 170/03 Schedule 22) as outlined in Elements 3 and 12 above. 2020-AI-01 (due 31-Dec-2022), -02 (due Fall 2022), and -03 (due Jan-2022) Action items identified as a result of Management Review are also being tracked to completion via QMS LIST 006.

DWQMS Reference	21. Continual Improvement
Evidence	PDS OP Element 21, QMS LIST 006 (rev.5, 9-Dec-2020) last updated 28-Apr-2022)
Summary	OP Element 21 is in place, implemented and conforms to QMS tracking and measuring of continual improvement requirements: a. to review and consider applicable BMPs including recommendations from MECP, staff suggestions, association wide best practices, external and internal audits, engineering, or contractor suggestions, etc. which have previously been reviewed as part of Management *(refer to Element 20 directly above)* and Infrastructure Reviews *(refer to Element 14).*

b. for identification and management of QMS Corrective Actions (e.g., resulting from nonconformities associated with internal / external audits and non-compliances as a result of MECP Inspections) as per QMS PROC 019 that includes, within QMS LIST 006:
   i) investigating the cause(s) of an identified non-conformity,
   ii) documenting the action(s) that will be taken to correct and prevent the non-conformity from re-occurring, and
   iii) reviewing the action(s) taken to correct and verifying that they are implemented and effective.
   iv) a process for identifying and implementing Preventive Actions (e.g., opportunities for improvement, actions identified during emergency response training/testing and from infrastructure and management reviews *[refer to Element 20]*, MECP inspection recommendations [1 related to backflow from 2016 and another from 2020 remain open], staff observations [all complete], etc.) to eliminate the occurrence of potential non-conformities that includes:
      1. reviewing potential non-conformities that are identified to determine if preventive actions may be necessary,
      2. documenting the outcome of the review, including the action(s), if any, that will be taken to prevent a non-conformity from occurring, and
      3. reviewing the action(s) taken to prevent a non-conformity, verifying that they are implemented and are effective in preventing the occurrence of the non-conformity.

   The QMS LIST 006 is now being regularly reviewed with the number of "in progress" items reduced for a 93% closure rate as of Apr-2022.

Finding: Opportunity for Improvement 2022-IA-OFI-05

Details: There is an opportunity to add Adverse Water Quality to the QMS LIST 006 for root cause review.

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Appendix D – External QMS Audit

The Corporation of the Town of Pelham

20 Pelham Town Square Box 400 Fonthill, Ontario, Canada, L0S 1E0

C0122277

Audit Type

SURVEILLANCE

Lead Auditor

James Pang

Registration

Ontario's Drinking Water Quality Management Standard Version 2

Recommendation

Executive Summary	
	QMS rep is well versed with the requirements of the DWQMS Standard.

Opportunities	
	One OFI

Opportunities for Improvements	
Location of OFI	Emergency Management
Discussed With	Ryan Cook
Description	The last test of emergency was conducted on July 14, 2020. As per their procedure, the next one is due in three years. That will mean that each Emergency SOP will only be tested once very 9 years, which is quite a long time. The management concerned may consider to have additional tests if any of the following happens: 1 - staff turnover 2 - introduction of new facilities and technology 3 - the service area may change 4 - any other event relevant to this facility This can be determined during the yearly management review.

Process	
Processes	**Observations**
Processes or Activities (DWQMS)-01	**Describe whether the process is effective or not (effectiveness should be supported with specific data/records/results). Include strengths & weaknesses of process:** All conforming elements are listed below with their respective comments: Element 1 - All 21 elements were incorporated in the Operational Plan (OP), Rev14 dated Feb 23, 2022. Element 2 - The Pelham Distribution System QMS Policy is as documented in S801-01. Element 3 - Owner's endorsement through a Council Resolution on March 22, 2021. Top Management endorsement by the Director of Public Works and Manager of Public Works on Feb 9, 2021. Element 4 - The Manager of Public Works is the QMS Rep. element 5 - As described in Document and Records Control Procedure 'QMS PROC 005' Element 6 - As described in section 6 of the OP, and in QMS PROC 016 "Sampling, Testing and Monitoring" Element 7 - As described in QMS PROC 007. Last annual review on March 30, 2022. Element 8 - As described in Risk Assessment Outcomes List QMS LIST 001. Last full risk assessment on July 14, 2020. Element 9 - As described in section 9 of the OP. elemetn 10 - As described in section 10 of the OP. Element 11 - As described in 'QMS PROC 011' Personnel Coverage Procedure and 'QMS SOP 004' Overtime Call-In element 12 - As described in QMS PROC 021 and 012. Element 13 - As described in QMS PROC 013. Element 14 - As described in QMS PROC 014 Element 15 - Reviewed the long term infrastructure plan projected until 2041 to be in general conformance. Element 16 - As described in QMS PROC 016 Element 17 - As described in QMS PROC 017 Element 19 - Reviewed records of internal audit performed by Tavares Group on Nov 16 and 2/9 Dec 2021. All 21 elements were addressed and it was found to be in general conformance. . Element 20 - Reviewed record of management review held on Dec 9, 2021 to be generally conforming. Top Management was in attendance, All required agenda items were covered. The Record included decision, action and timeliness where relevant. Element 21 - The continual improvements of the QMS was logged in the QMS List 006 Corrective and Preventive Action List last updated on April 6, 2022