



Port Colborne Distribution System
Summary QMS Report
for the
Management Review

Report Prepared on:
September 28, 2021

For the period of:
January 1, 2020 -August 31, 2021

Executive Summary

- This management review summary covers the period from January 1, 2020 until August 31, 2021. The previous Management Review was planned to be done in two parts but due to the ongoing COVID pandemic and staffing changes, the second part never took place and is instead being combined into this review.
- There were no incidents of regulatory non-compliance in this period
- There were three (3) adverse test results (1 microbiological and 2 low free chlorine) in this period. In all instances clear re-samples indicated the water was safe.
- The 2021 Internal Audit is scheduled for October 19, 2021
- The desktop level external surveillance audit took place in November 2020 and the 2021 external audit is scheduled for November 2021.
- Number of main breaks in 2020 totaled 16 and in 2021 there have been 7 so far.
- Staff maintenance targets and operational performance indicators that were set in 2019 and adjusted 2020 were not as closely tracked throughout 2020 and 2021 due to staffing changes and the ongoing COVID pandemic which put a strain on staffing resources. Indicators are positive but need to be reviewed in more detail before the end of the year.
- The City's water purchases decreased in 2020, falling by 5.6%. As the volume of water sold to the City's customers only experienced a 0.4% decrease in 2020, it is likely that the majority of the decrease in purchases is a direct result of the efforts by the Water Wastewater Division to not only find and repair any watermain breaks in a timely fashion, but also to take a conservative, prudent approach to maintenance flushing activities.
- Tracking of unbilled water in 2020 and the start of 2021 was not as consistent as in 2019, due in part to the ongoing COVID pandemic and staffing changes.
- The City's Municipal Drinking Water Licence and Drinking Water Works Permit were renewed in October 2019.
- Water quality complaints totaled 20 in 2020 and 16 so far in 2021. Where the source of the complaint could be determined, activities in the distribution system (valve turning, hydrant flushing) were the most common sources.

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Introduction

Purpose

The purpose of this report is to summarize the activities of the Port Colborne Distribution System (PCDS) Operating Authority so that Top Management can ensure the continuing effectiveness of the Quality Management System (QMS) at scheduled Management Reviews.

Scope

This Summary Report for the Management Review covers key operational elements of the Drinking Water Quality Management Standard (DWQMS) from January 1, 2020 to August 31, 2021. The last Management review was intended to be Part 1 of a two part series. Due to various factors such as the ongoing COVID pandemic, staffing shortages and training of new staff, it was decided to postpone Part 2 of the Management Review and complete a single Management Review meeting for 2021 to meet the requirements of the DWQMS.

Top Management reviews the information specified in:

Procedure QMS-SOP20-1 Management Review

This review will include, but is not limited to, the following:

- a. Incidents of regulatory non-compliance
- b. Incidents of adverse drinking water tests
- c. Deviations from critical control point limits and response actions
- d. Effectiveness of the risk assessment process
- e. Results of internal and third party audits, including best management practices
- f. Results of relevant emergency response testing
- g. Operational performance
- h. Raw water supply and water quality trends
- i. Follow up on action items from previous management reviews
- j. Status of management action items identified between reviews
- k. Changes in resource requirements, infrastructure, process, personnel, the Standard or regulations that could affect the QMS
- l. Consumer feedback
- m. Resources needed to maintain the QMS
- n. Results of infrastructure review
- o. Operational plan currency, content and updates
- p. Staff suggestions

Summary of Items

a. Incidents of Regulatory Non-Compliance

There were no reportable regulatory non-compliances during this time period. The “Port Colborne Distribution System Annual Drinking Water Quality Report” for 2020 was presented to Council in March 2021 and details the City’s compliance with the regulations. The 2021 report will be prepared in February of 2022.

b. Incidents of Adverse Drinking Water Tests

There were three (3) Adverse Drinking Water Tests over this reporting period. Two adverse drinking water tests were due to low free chlorine. The watermain was immediately flushed to restore secondary disinfection. One adverse drinking water test in 2020 was due to a microbiological sample result in which total coliforms were detected. In this case, subsequent flushing and resampling indicated that microbiological organisms were absent from samples up and downstream of the adverse sample location, and free chlorine levels were well above the minimum regulated requirement of 0.05mg/L.

c. Deviations from Critical Control Point Limits and Response Actions

Critical Control Limits (CCL) for the PCDS are, where applicable, higher than the regulated limits, which then trigger a response procedure. During this period, Staff responded appropriately to low free chlorine levels (<0.20 mg/L but >0.04 mg/L) by flushing the distribution system to bring the chlorine levels up. Routine dead end flushing aided in ensuring free chlorine levels remained adequate.

d. 2020 Risk Assessment

A full Risk Assessment must be completed every 3 years. The result outcomes from the last full risk assessment completed in 2019 are attached as Appendix 1.

A Risk Assessment review takes place annually between the full Risk Assessment. The 2020 Risk Assessment review was conducted on December 15, 2020. During this assessment the hazardous events, control measures and mitigating processes were reviewed. It was discussed that additional items should be assessed during the full review in 2022, such as the risk of personnel shortages due to pandemics or other major events, and to evaluate risks related to climate change. The next risk assessment in 2022 will evaluate these items and any other that come up during the Management Review.

e. Results of Internal and Third Party Audits

Nonconformances (NCs) and Opportunities for Improvement (OFIs) that were generated during the report period are summarized in the Nonconformance and Corrective Action Logs provided in Appendix 2.

Internal Audit

The 2020 Internal Audit took place on October 5, 2020 and the 2021 internal audit is scheduled for October 18, 2021.

The 2020 Internal Audit was completed by an auditor from Acclaims Environmental and was conducted remotely. The Operational Plan and supporting documents were reviewed for conformity to the DWQMS 2.0. The auditor identified 4 opportunities for improvement which are summarized in the 2020 Log in Appendix 2.

Many positive findings were noted during the audit such as:

- Staff interviewed were knowledgeable about their processes and programs and their roles' impacts on achieving the commitments included in the QMS Policy.
- Evidence of staff involvement in the annual budget process and pandemic response plans helps instill a collaborative approach in addressing system deficiencies and challenges.
- In 2020, Port Colborne effectively began using its Nonconformance and Corrective Action Log to track action items from meetings. This helps ensure that logged action items in meeting minutes are not forgotten and helps facilitate continual improvement.
- The implementation of the Compliance / DWQMS Deadlines 2020 worksheets has helped track and complete important regulatory- and QMS-required tasks, with notes on future years' deadlines.
- From the onset of the COVID-19 pandemic, adjustments to normal operational programs and schedules to accommodate the protection of staff health & safety were prioritized.

External Audits/Accreditation Status

The City's auditor from SAI Global completed the desktop portion of the re-accreditation audit on November 4, 2020. The next desktop level external audit is scheduled for November 5, 2021, with a full re-accreditation audit planned for 2022.

The auditor identified 5 OFIs during the 2020 desktop level audit, which are included in Appendix 2. No non-conformances were noted during the audit.

Ministry Inspections

The Ministry of the Environment, Conservation and Parks (Ministry) performed an unannounced inspection of the PCDS on November 25, 2020 with an inspection review period from September 1, 2019 to October 31, 2020. The Inspector raised no findings, nor were any recommendations provided. The PCDS was assigned a rating of 100%.

f. Results of Relevant Emergency Response Testing

There was no emergency response testing completed during the report period. As per the Distribution System Emergency Preparedness Plan, testing is required every five years, therefore, the next test is required to be completed in 2022.

g. Operational Performance

Table 1 summarizes Operational statistics for the PCDS from January 1, 2020 to August 31, 2021. There were 15 watermain breaks recorded in 2020 and 7 so far in 2021.

Table 1: PCDS Activity Report

ITEM	AMOUNT	
	2020	2021 (up until Aug 31)
Distribution Samples		
Bacteriological (approx.)	425	280
Operational (free chlorine)	1,767	1,497
Adverse Samples	2	1
Lead Samples		
Distribution – Alkalinity and pH	8	8
Distribution – Lead (Exempt from plumbing sampling as of Dec/09)	0	0
Sample results > 10 ppb	0	0
Watermain breaks	16	7

In 2020, staff adjusted operational performance indicators (OPI) for various infrastructure components and levels of service. A summary of the 2020 and 2021 statistics are provided in Table 2 below. Due to staff changes, much of this data is still being compiled and may not reflect all of the efforts made to meet the targets. This will be discussed further during the meeting.

Table 2: PCDS Maintenance and Operational Performance Indicators (OPI)

Maintenance Activity	Target/OPI	Status 2020	Status 2021 (up until Aug 31)
Watermain Breaks	Meet response times in SOP	22 breaks met response times	8 met response times
Valve Exercising, Inspections	25% annually/< 5 inoperable	456 completed 25%	232 of 1823 valves turned =12.7%
Hydrant Inspections	100% annually/< 5 inoperable	-	557 hydrants completed <5 inoperable
Winter Hydrant Inspection	2 inspections (Nov 1-Dec 31 and Jan 1-Apr 1)/0 frozen	-	N/A
Fire flow testing	100% Completed over ten (10) yrs/<2 out of service, marked within 60 days	95 completed	4 completed this year
Curb stop/curb box repairs	Repair < 2 weeks	-	Met
Emergency service repairs	Meet response times in Watermain Break SOP	-	Met
Inspect bulk water stations	Annual/< 2 service disruptions	-	-
Dead end flushing	Weekly, May-Oct, autoflush stations/0 AWQIs, <10 complaints	Was done as reactive vs proactive	Completed on a monthly basis. 2 AWQIs. Repairs made to auto flushers and developing bi annual maintenance program
Backflow inspections	Annually or as required/<40% failure	-	-

Total water purchases from the Region's Port Colborne Water Treatment Plant decreased in 2020, falling by 5.6% from 2,656,040 m³ in 2019 to 2,515,060 m³ (Figure 1, Table 3). As the volume of water sold to the City's customers only experienced a 0.4% decrease (1,632,856 m³ in 2019 vs. 1,625,882 m³ in 2020) (Figure 2, Table 3), it is safe to assume that the majority of the decrease in purchases from the Region is a direct result of the efforts by the Public Works Department to not only find and repair any watermain breaks in a timely fashion, but to also take a conservative, prudent approach to maintenance flushing activities.

Figure 1: Annual Water Purchases since 2010

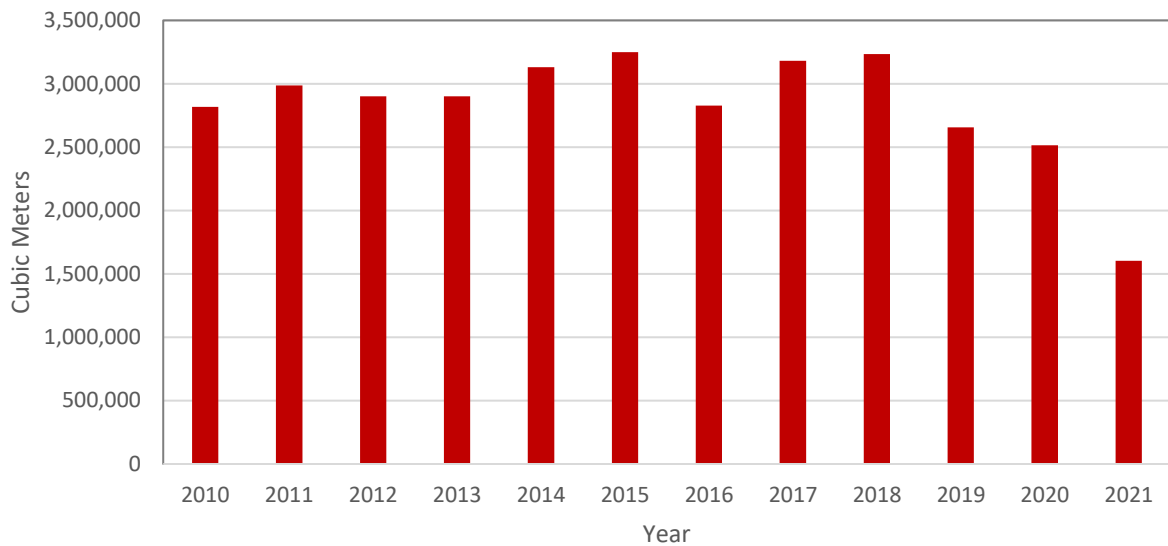
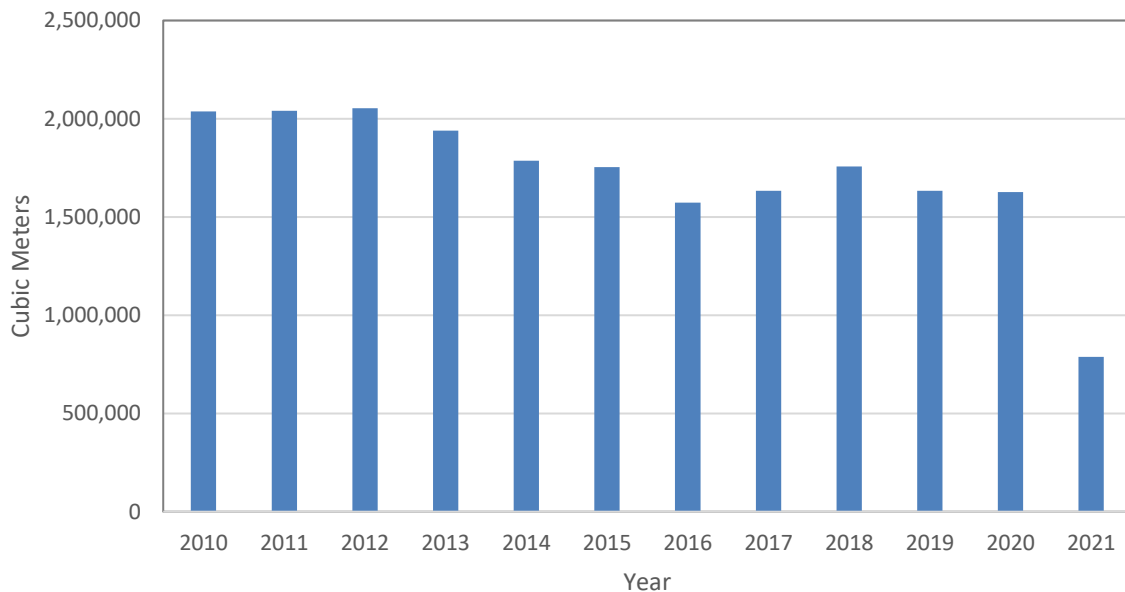
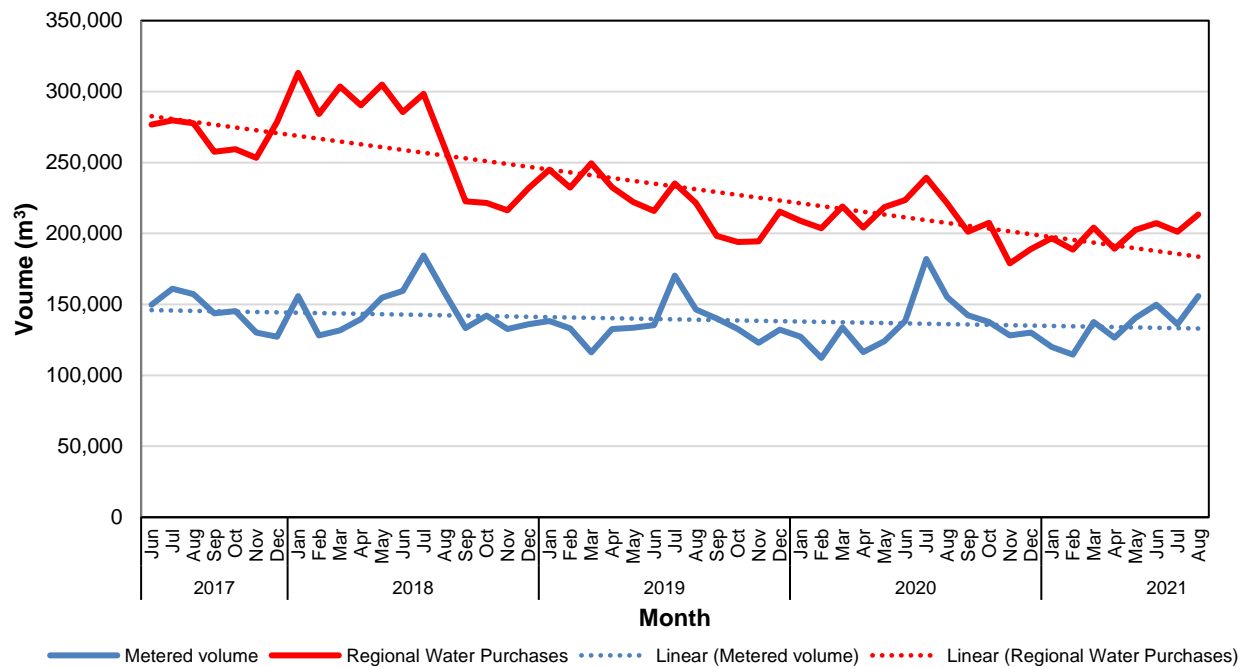


Figure 2: Annual Water Sales since 2010

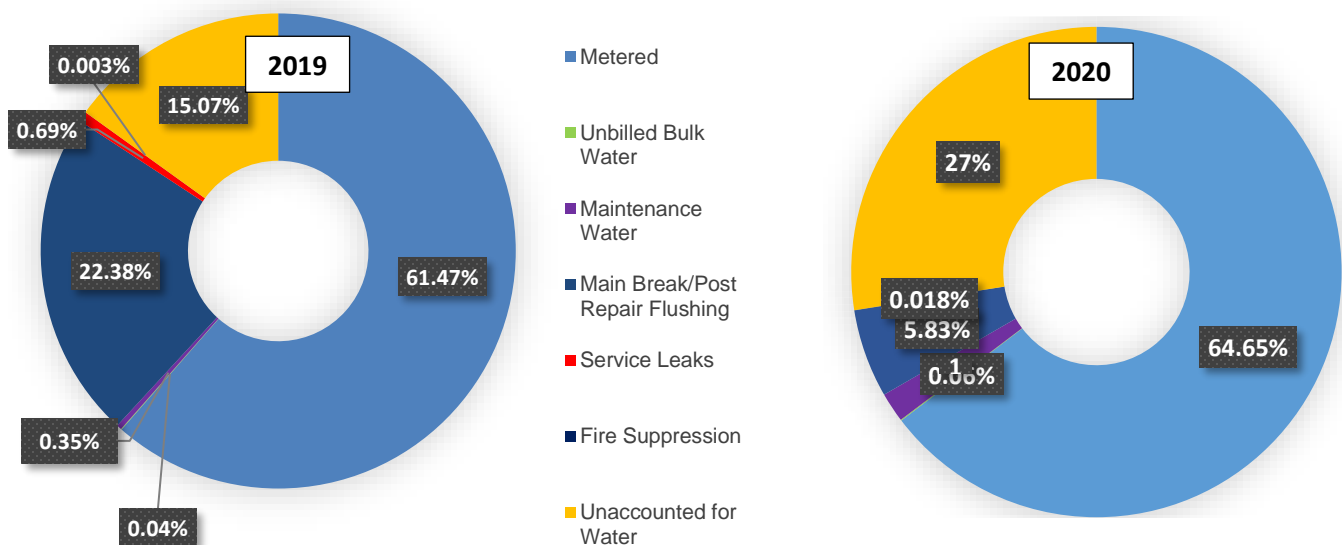


Since obtaining the ability to read all the water meters in the City monthly, we have tracked actual metered volumes against monthly purchases from the Region. Figure 3 below compares the monthly metered volumes from June 2017 to August 2021. There is generally a good correlation between the amount of water purchased vs. the amount of water metered.

What is most encouraging is the fact that the monthly trend between purchased and metered is narrowing and that, overall, monthly purchases from the Region have been declining while monthly metered volumes have remained relatively stable.

Figure 3: Monthly Purchased Volume vs. Monthly Metered Consumption - June 2017 to August 2021

In 2019, staff started to track all sources of unbilled water. As a result, staff were able to reduce the percentage of unaccounted for water from 46% in 2018 to just over 15.7% in 2019, but there is an increase again in an unaccounted water in 2020 to 27% (Figure 4). This is due in part to lack of detailed tracking due to staffing shortages and staff changeover.

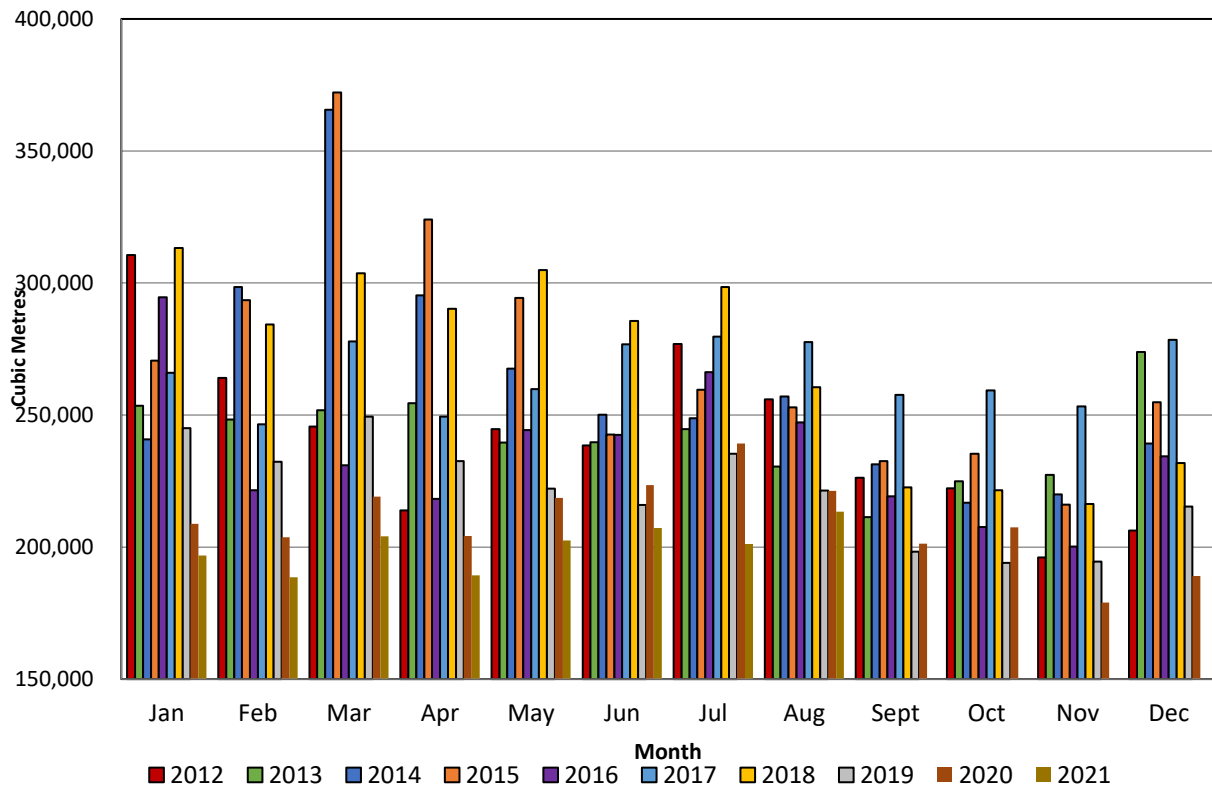
Figure 4: Proportion of Billed vs. Unbilled Water (by source) – 2019 vs 2020 (2021 data not available)

From a volume standpoint, by accurately tracking the water used in maintenance activities and using tools to estimate the water lost during a watermain break incident, it is evident that watermain breaks and post-repair flushing use the greatest amount of unbilled water (Table 3). The commitment to tracking water usage will not only allow staff to accurately calculate the annual volume of unaccounted for water, but will also allow the impact of watermain renewal to be assessed. The unfortunate reality of aging infrastructure is that watermain breaks will increase in frequency, and thus more water will be lost. Increased investment and accelerated replacement of aging infrastructure should reduce the amount of water lost due to watermain breaks and post-repair flushing, and that reduction should be captured during the annual analysis of water consumption data.

Table 3: Breakdown of Billed and Unbilled Water Volumes – 2019 vs 2020 vs 2021 (to Aug 31)

		2019	2020	2021 to August 31
Purchased	Purchased volume	2,656,040	2,515,060	1,602,940
Billed	Metered volume	1,632,548	1,625,882	1,079,809
Unbilled	Unbilled Bulk Water	1,178.16	1,509	1,212
	Maintenance Water	9,254.30	49,291.50	-
	Main Break/Post Repair Flushing	594,362.28	146,523.50	-
	Service Leaks	18,330	-	-
	Fire Suppression	92	4,500	0
	Unaccounted for Water	400,275.26	691,403.99	521,918.92

Figure 5 illustrates the unique Port Colborne consumption trend, which almost always sees the City using more water in the first quarter of the year, as opposed to all other municipalities in Niagara which use more water in the warmer summer months. Region and City staff are unclear as to why this trend occurs in Port Colborne. Although in 2020 that trend is actually no longer consistent and July had the highest purchased amount.

Figure 5: Volume of Water Purchased from RMON each Month - Jan 2012 to Aug 2021

h. Raw Water Supply and Water Quality Trends

The Regional Municipality of Niagara (Region) supplies all drinking water to the PCDS, and as such, is responsible for all testing of the raw water supply (Welland Canal). Results of the testing are provided annually to the City in the Region's annual report.

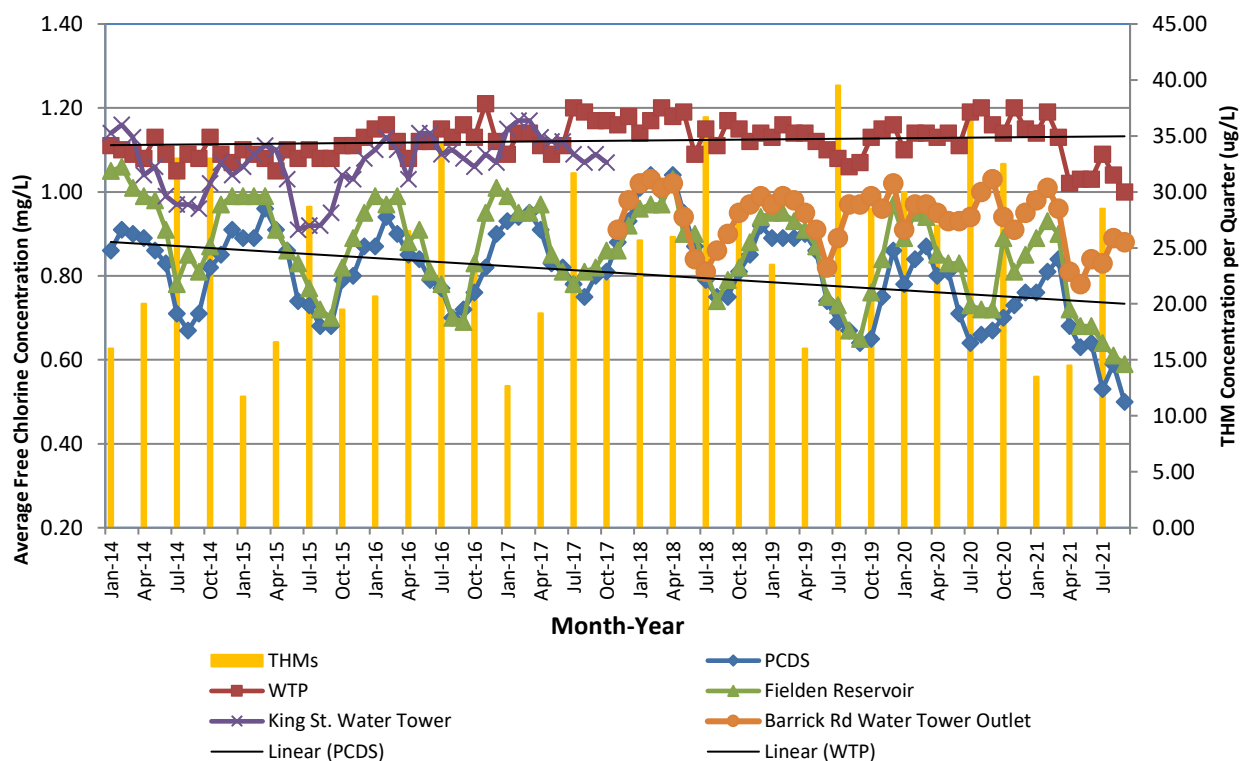
Within the PCDS, the City is required to collect samples on a routine basis and evaluate them for a number of parameters. Microbiological samples, in addition to free chlorine samples are the best indicators of water quality trends within the PCDS. As indicated in Table 1 and detailed in section b. above, there were a total of three (3) adverse samples in 2020 and 2021 so far.

Figure 6 below illustrates the average monthly free chlorine concentrations within the PCDS, compared to the average monthly free chlorine concentrations exiting the Water Treatment Plant (WTP), Fielden Avenue Reservoir (Reservoir) and Water Tower (King Street 2014-Oct 2017, Barrick Road Oct 2017-present) (data provided by Region staff).

As expected, free chlorine concentrations in the PCDS are lower than those exiting the WTP, the Reservoir and Water Tower; although free chlorine concentrations leaving the Barrick

Road Water Tower are closer to the PCDS concentrations than the King Street Water Tower concentrations were. Additionally, the relationship between warmer months and chlorine levels can be clearly observed, with free chlorine levels declining during the warmer months. It is interesting to note that the chlorine levels leaving the WTP, which had been quite consistent since late 2013, with average annual FAC levels of 1.09 mg/L, climbed to an average of 1.14 mg/L in 2016 and have remained high, averaging FAC of 1.15 mg/L in both 2017 and 2018 and averaging 1.12 mg/L in 2019. In April 2021 a decline in FAC was noticeable leaving the WTP averaging just above 1.00 mg/L, which appears to be linked to the drop in FAC in the Fielden Reservoir and PCDS. This issue is being closely monitored by staff and discussions are ongoing with Niagara Region staff

Figure 6: 2014-2021 Average Monthly Free Chlorine Concentration Comparison between PCDS and Regional facilities vs. Quarterly Average Trihalomethanes



Quarterly trihalomethanes (THM) in 2020 were slightly higher than the levels observed in 2019. Overall, average THM concentrations have remained relatively stable since 2013 (Table 4).

Table 4: Average Annual Trihalomethanes Concentrations – 2009-2018

Year	Average Trihalomethanes (µg/L)
2009	31.00
2010	25.25
2011	7.50
2012	16.75
2013	26.00
2014	25.50
2015	19.12
2016	26.08
2017	22.30
2018	29.04
2019	26.88
2020	31.50
2021 (to Aug 31)	18.83

The City began sampling for Haloacetic Acids (HAAs), as required by the regulation, on a quarterly basis in 2017. The City is required to begin reporting results in January 2020. HAAs have remained far below the Ministry's maximum acceptable concentration of 0.08 mg/L (or 80 µg/L) in 2020 and into 2021. These results indicate that HAAs are not going to be a water quality issue in the distribution system.

i. Follow up on Action Items from Previous Management Reviews

Action Items:

- Sampling SOP - It was asked if the City's sampling procedure included instructions on how to check the sample bottle to ensure it was "good" before using it to collect a sample. Staff indicated they would check the procedure and incorporate if the procedure didn't contain that information
 - STATUS: Procedure revision is in progress and is high priority
- Reagent storage/disposal – It was discussed that a process for reagent storage/disposal will be created to ensure expired standards and reagents won't be used during watermain commissioning, and it was suggested that there may be an opportunity to set up automatic notifications regarding expiry dates.
 - STATUS: Procedure finalization in progress
- Region communication in event of shutdown of Region facility – outcome of the 2017 mock emergency. The City was concerned that the Region does not notify the City of all outages/upsets at Region facilities. While it is true that the majority of system outages/upsets at Regional facilities will have little to no impact on the City's distribution system, knowing the status of the Regional facilities in the event of a distribution system incident and/or emergency would only assist the City and the Region in providing the highest quality drinking water and customer service to our residents –

as drinking water is shared responsibility. Director was to discuss with Region's leadership team

- STATUS: To be discussed at the meeting.
- Frozen Water Services Hotline – repurposing as a hotline where residents could call to listen to a recorded message and receive information during a water emergency – number would be provided in all advisories and communications. Monitoring evolution of the customer service position(s) to determine if hotline is still required.
 - STATUS: Ongoing.
- Alternative “local” chemical laboratories - There are no local chemical labs approved by the Ministry for drinking water analyses. The Region has an agreement with a laboratory in Waterloo, and has a key and code to access the laboratory in order to drop off samples 24/7, and they have pricing for 24/7 analysis in the event of an emergency. Investigate more alternative laboratories for the City and discuss emergency sampling with the current laboratories.
 - STATUS: To be discussed at the meeting
- Leak detection on Region's trunk watermain – the Region does not do active leak detection on their trunk watermain, however, it has been indicated that there is an appetite to pursue program(s).
 - STATUS: Ongoing
- QMS Rep back up - there remains no defined back up to the QMS Representative and succession planning has not yet been discussed. It was asked if there was an opportunity for local municipalities to back each other up, as many of the smaller municipalities do not have a back up for their QMS Rep.
 - STATUS: Climate Change Coordinator fulltime FTE will act as backup.
- Health Canada Lead Levels – Health Canada officially released updated guidelines for lead in drinking water in March, 2019 – lowering the acceptable concentration of lead in drinking water from 10 µg/L to 5µg/L. The Ministry will likely also lower their limit (currently 10 µg/L), and may require those municipalities that are currently exempt from collecting and analyzing plumbing samples to commence sampling again. Port Colborne has been exempt from sampling plumbing (homes and businesses) since 2010. A review of historical plumbing sample results indicates there were two exceedances of the 10µg/L limit in 2008, and while there were not exceedances of the limit in 2009, there was one plumbing sample that was higher than the proposed 5µg/L limit.
 - STATUS: Staff will continue to monitor communications from the Ministry and inform Top Management as required. No changes have occurred yet.
- Asset Management Planning Regulation – O. Reg. 588/17 came into force on January 1, 2018.
 - STATUS: Ongoing. To discuss at the meeting.

- QMS Standard Operating Procedures - Councillor Wells to investigate possible on-line method to access DWQMS SOPs that are referenced in the Operational Plan. Councillors don't have access to IBM Notes, so are unable to access the Quality Management System database, and the files are too large to email out. It was discussed if there was a secure online tool that the Councillors could access to view the procedures.
 - STATUS: Update to be provided at the meeting.
- It was discussed that when buildings are demolished, that the Utilities group needs to be kept in the loop to ensure that the water service and sewer lateral are correctly decommissioned to ensure the service is not leaking and that the sewer lateral is not allowing infiltration into the wastewater collection system.
 - STATUS: Still in progress
- Engineering is working on a procedure for Planning and Building Department tasks and will incorporate.
 - STATUS: Action item.
- It was discussed whether it would be feasible to go back through all demolitions in the last five years to ensure that the services were properly decommissioned.
 - STATUS: Update to be provided at the meeting.

j. Status of Management Action Items Identified Between Reviews

There were no Management Action Items identified since the previous management review.

k. Changes That Could Affect the QMS or the PCDS

- *Sanitary and Storm Sewer Design Criteria and Wastewater Collection Environmental Compliance Approvals (ECAs)*
Port Colborne will have to apply for a Consolidated Linear Infrastructure ECA by January 2022. While this falls outside of the scope of the QMS, there will be significant effort required to comply with the new ECA requirements and could impact staffing and other resources.

l. Consumer Feedback

There were 20 complaints received in 2020. 18 of the complaints were about dirty water and 2 were about taste/odour. The exact cause of most of the complaints was not known at the time of the site visit. In most cases, the water had already cleared, so the operator was unable to ascertain what the cause may have been; however, in all these "unknown" cases, the

samples collected by the operator during the site visit were well within acceptable parameters. Where the source of the complaint could be determined, activities in the distribution system (i.e. valve turning, hydrant flushing) were the cause of the dirty water.

So far in 2021, 16 complaints have been received. 15 of which were dirty water and 1 was odour. Half of the complaints were due to the Niagara Region turning valves on June 22-23.

m. Resources Needed to Maintain the QMS

As outlined in section k, there may be a need for additional resources depending on the additional workload to comply with the new CLI-ECA.

n. Results of Infrastructure Review

The Infrastructure Review must be completed once every calendar year. The last Infrastructure review was completed on December 15, 2020 and the next one is planned for early December 2021. It was discussed that Erie Street and Davis Street are the priority watermain projects. Currently the Erie St watermain design is underway.

The Infrastructure Needs Study and Asset Management Plan will assist with capital planning.

o. Operational Plan Currency, Content and Updates

The Operational Plan has been updated to reflect the organization and staff changes and updated with the new logo. The Operational Plan is set to go to Council at the end of October 2021 to be endorsed.

p. Staff Suggestions

Staff suggestions, where applicable, are captured under the Corrective Action Logs with Source identified as “other.”

q. New or Other Business

To be determined during the meeting.

r. Next Scheduled Review

The suggestion from a previous Management Review was to meet ahead of the water/wastewater budget and then ahead of the internal audit. The requirement is to conduct a Management Review once every calendar year. Therefore, it's proposed to have the next Management Review in September 2022.