UTILITIES
PETERBOROUGH
COMMISSION
WATER
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2022

Peterborough Utilities Commission Water Utility Asset Management Plan

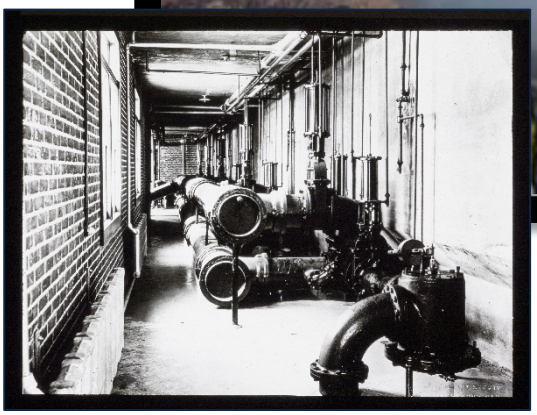


TABLE OF CONTENTS

EXECUTIVE SUMMARY

OVERVIEW

The City of Peterborough's water treatment and distribution system is operated and maintained by the Peterborough Utilities Commission (PUC). This Asset Management Plan (Plan) has been developed by the PUC on behalf of the City of Peterborough.

The purpose of this Plan is to identify and describe current asset management (AM) programs for the City of Peterborough's Water services, which inform how the water assets will be managed to achieve service levels and Key Performance Indicators (KPI). Water assets include assets that relate to the collection, production, treatment, storage, supply, or distribution of drinking water.

The functional responsibility of the Plan is to ensure the supply and distribution of clean, safe drinking water to all properties in the City of Peterborough that are connected to the municipal supply, including all support activities that are performed to achieve all levels of service. Water assets are considered Core Assets under Ontario Regulation (O.Reg) 588/17.

ASSET INVENTORY SUMMARY

The City of Peterborough's water treatment and distribution system is comprised of one (1) water treatment plant, nine (9) pumping stations, five (5) water storage facilities, and approximately 470 km of watermains.

The overall water treatment and distribution system has an estimated replacement value of $1.036 billion dollars at end of year 2021. The water distribution system (including all watermains, valves and associated chambers, water services, hydrants, and water meters) accounts for approximately $826 million of the total replacement value or 80%.

The average remaining useful life of major water asset categories (including facilities, fleet, watermains, water services, ancillaries (valves and hydrants) and water meters) varies from 25% to 60% of overall remaining life.

The overall condition of all water assets, using a weighted average based on replacement cost and grouped by category, are considered to be in good condition, with approximately 71% of assets in good condition and 29% of assets in fair condition.

Vertical water assets (including the water treatment plant and all facilities) are considered to be in overall fair condition (54%) with 12% in very good condition, 12% in good condition, 7% in poor condition and 15% in very poor condition.

Linear water assets (including watermains, valves and water services) are considered to be in overall good condition (68%), with 32% in fair condition and a very low percentage (<0.005%) in poor condition.

In general, the condition of water assets is regularly assessed through physical condition assessments, however physical assessments are not always possible due to the location of some assets such as buried pipes and valves. Where physical assessments are not possible, the asset condition is estimated based on industry standards, historical data, and staff experience.

LEVELS OF SERVICE

The levels of service provide a summary of key performance indicators, current measures, and associated targets for the water service area. Comparing the measures to the targets indicates how well the water utility is performing and helps confirm the effectiveness of the overall asset management program. Targets have been set based on industry standards as well as staff experience and statistics specific to the Peterborough water system.

Some performance indicators include the number of watermain breaks per 100 km, water service breaks, customer quality complaints, boil water advisories, and percentage of non-revenue water pumped into the water distribution system.

Based on year end 2021, all identified targets have been achieved or exceeded.

LIFECYCLE STRATEGIES AND COSTS

The PUC carries out various strategies and activities to maintain current levels of service and maintain/extend the useful life of water assets. Major activities that are undertaken in this regard include infrastructure rehabilitation and replacement, and regular inspection and maintenance activities.

Capital and operating costs for the water utility are reviewed and approved yearly through the Water Utility Commission, which is typically comprised of the mayor of the City of Peterborough as Chair and various city councillors as members.

As of 2022, the combined capital and operating costs on a yearly basis are currently close to $20 million dollars and have been summarized, respectively, for a ten (10) year planning period.

RISKS

The impacts of climate change highly influence the overall asset management strategy and associated decision making, and directly correlate with many risks faced by all water utilities.

A risk assessment analysis for the Peterborough water system has been developed under the PUC Drinking Water Quality Management System (DWQMS) and includes risks associated with, or impacted by, climate change. The risk assessment is comprehensively reviewed annually by PUC top management. A copy of the 2022 risk assessment is included in Appendix F for reference.

Risks have been identified and rated based on three (3) criteria – likelihood, impact, and level of risk, respectively. Higher rated risks directly influence decisions made in the asset management and financial budgeting process.

SUMMARY

The PUC has been managing and operating the Peterborough water system for over 100 years. Since the inception of PUC, asset management has been a core function of the utility through ensuring that the water utility is operated effectively, efficiently, safely, and reliably.

The Plan provides detailed information on the framework for managing all water assets in the City of Peterborough, as well as key metrics to measure effectiveness and long-term sustainability. The Plan will be reviewed and updated in future iterations, incorporating new best practices, strategies, and recommendations over time as well as tracking new assets, overall asset conditions, and rehabilitation/replacement efforts.

The majority of water infrastructure (71%) is considered to be in good condition, however there are several assets that are in poor to very poor condition that will require rehabilitation or replacement prioritization in the coming years. Diligence and continued use of asset management planning is required to ensure that the financial allocation of resources continues to keep the water assets in overall good condition while reducing risks and minimizing operating costs.

1.0 INTRODUCTION

1.1 BACKGROUND

The Water Utility in Peterborough was established in 1882, making it among the oldest in the country. Over the years the utility has established itself as a leader in water quality and supply, including being among the first to establish a rapid sand filtering system and to introduce chlorine disinfection. In addition, the Peterborough Utilities Commission (PUC) has some unique features including the ability to generate electricity and use turbines to harness power from the Otonabee River to pump water through the distribution system from the treatment plant.

The City of Peterborough's Water Treatment and Distribution System is operated and maintained by the PUC. This Asset Management Plan (Plan) has been developed by the PUC on behalf of the City of Peterborough.

1.2 ASSET MANAGEMENT PLAN PURPOSE AND RESPONSIBILITY

The purpose of this Plan is to identify and describe current asset management (AM) programs for the City of Peterborough's Water services, which inform how the water assets will be managed to achieve service levels and Key Performance Indicators (KPI). Water assets include assets that relate to the collection, production, treatment, storage, supply, or distribution of drinking water.

The functional responsibility of the Plan is to ensure the supply and distribution of clean, safe drinking water to all properties in the City of Peterborough that are connected to the municipal supply, including all support activities that are performed in order to achieve this service. Water assets are considered Core Assets under Ontario Regulation (O.Reg) 588/17.

1.3 SUMMARY OF WATER ASSETS AND ASSOCIATED DATA

For a high-level summary of the assets covered in this Plan, refer to Table 2 in Section 2.1. For detailed summaries of assets, please refer to Section 2.5 for vertical assets and Section 2.6 for linear assets. The infrastructure assets included in this Plan have a total replacement value of approximately $1.036 billion dollars as summarized in Table 3 in Section 2.2.

Most of the information in this Plan, including financial information, is based on data available as of December 31, 2021. Condition assessments for all major vertical assets, including the water treatment plant, have been performed in 2022 and are included in Appendix B and C for reference.

1.4 ASSET MANAGEMENT PLANNING PERIOD AND SERVICE LEVEL REQUIREMENTS

The Plan uses a 10-year planning period and takes into account the lifecycle of the various assets to forecast investment and renewal requirements. Before July 1, 2025, this Plan will be updated to include the proposed service level requirements for these assets in accordance with the O.Reg 588/17. The Plan will be reviewed and reported to Council annually, following the final phase implementation of O.Reg 588/17 in 2025, and will be fully re-evaluated every five (5) years.

1.5 KEY BACKGROUND AND PLANNING DOCUMENTS

The Plan is to be read with other City and PUC planning documents. This should include the Strategic Asset Management Policy (SAMP) along with other key planning documents. Note that all documents described below refer to the current version.

- City of Peterborough Asset Management Plan
- Water Utility Master Plan
- Development Charges Background Study
- City of Peterborough Official Plan (Adopted November 2021)
- Water Street Dam and Pumphouse Structural Assessment

All supporting documentation can be found either on the City of Peterborough's website at www.peterborough.ca or on the Peterborough Utilities Services website at www.peterboroughutilities.ca.

1.6 ASSET CONDITION RATINGS

Major water assets have been assigned a condition based on a physical inspection or, where this is not feasible, an estimated condition. The rating scale used to describe an asset's condition and corresponding points scale is shown below in Table 1.

Table 1: Asset Condition Rating Scale

Asset Condition	Numerical Rating
Very Poor	1
Poor	2
Fair	3
Good	4
Very Good	5

1.7 ASSET MANAGEMENT PLAN KEY STAFF

The Plan has been prepared by internal staff in the PUC. Key staff in the preparation, review, and implementation of this Plan are summarized below in Table 2.

Table 2: Asset Management Plan Key Staff

Key Staff	Position
Pat Devlin	Vice President Water Utility
Michael Meyers	Water Utility Manager
René Gagnon	Water Treatment Plant Manager
Kevin Conlin	Water Utility Engineer
John Sayles	Senior Water Engineering Technician

2.0 STATE OF INFRASTRUCTURE

2.1 OVERALL INVENTORY DETAILS

The water assets in the City of Peterborough have been divided into two (2) overall categories: vertical and linear assets. Vertical assets include all facilities and related items and are summarized in Section 2.5. Linear assets include all underground infrastructure such as pipes, valves, and water services, as well as water meters, communication devices and fire hydrants, and are summarized in Section 2.6. For detailed information on both vertical and linear assets, refer to these sections. For a detailed map of the City of Peterborough Water System, including distribution system and major facilities, see Appendix A.

Table 3 below provides high level details of the City of Peterborough's overall water asset inventory including both vertical and linear assets.

Table 3: Overall Water Asset Inventory

Asset Class and Sub-Class	Asset	2022 Quantity	Unit of Measure
Vertical (Treatment/Pumping/Storage)			
Facilities	Water Treatment Plant	3	Buildings
	Water Street Dam	1	Structures
	Pumping Stations	9	Buildings
	Water Storage	5	Structures
	Bulk Fill Station	1	Buildings
Fleet	Vehicles, Backhoes, Trucks	30	Each
Linear (Distribution)			
Distribution Watermain	All Sizes	470	Km
Water Services	All Sizes	27,722	Each
Ancillaries	Valves (including chambers)	6,938	Each
	Hydrants	2,394	Each
Water Meters	All Sizes	28,836	Each
Communication Devices	All Types	44	Each

2.2 OVERALL REPLACEMENT COSTS

The estimated year end 2021 replacement costs for the water utility totals approximately $1.036 billion dollars. Replacement costs were determined using competitive pricing from recent construction projects, including all applicable overhead, where possible. Historical costs in conjunction with inflation were used where recent costing information was not available.

Figure 1 and Table 4 below summarize the overall replacement cost by asset sub-class.

Figure 1: Overall Replacement Cost by Asset Sub-Class

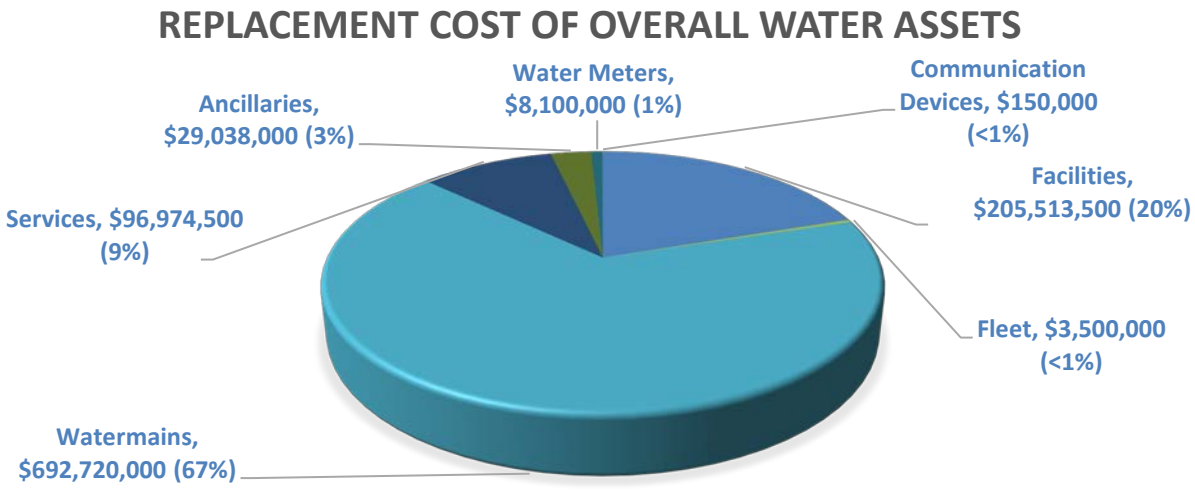


Table 4: Overall Replacement Cost by Asset

Asset Class and Sub-Class	Asset	2022 Replacement Cost
Vertical (Treatment/Pumping/Storage)		
Facilities	Water Treatment Plant	$110,500,000
	Water Street Dam	$31,000,000
	Pumping Stations	$25,320,000
	Water Storage	$38,200,000
	Bulk Fill Station	$493,500
Fleet	Vehicles, Backhoes, Trucks	$3,500,000
Linear (Distribution)		
Distribution Watermain	All Sizes	$692,720,000
Water Services	All Sizes	$96,974,500
Ancillaries	Valves (including chambers)	$12,280,000
	Hydrants	$16,758,000
Water Meters	All Sizes	$8,100,000
Communication Devices	All Types	$150,000
TOTAL		**$1,035,996,000**

2.3 OVERALL REMAINING USEFUL LIFE

The expected useful life of an asset is the estimated period of which use of the asset is anticipated. Estimates are based on the calculated age (not observed age) and take into account any betterments that extend the useful life of the assets.

The overall expected useful life and average remaining useful life have been calculated using weighted averages based on the respective asset replacement value. The percent of useful life is a weighted average based on replacement value of each sub asset from the vertical and linear asset detailed breakdowns, which are summarized in Sections 2.5 and 2.6.

The age of water assets is highly variable due to the age of the Peterborough water system, and there is not always a linear relationship between age and condition considering each asset type.

Table 5 below shows details of the overall remaining useful life.

Table 5: Overall Remaining Useful Life

Asset Class and Sub-Class	Expected Useful Life (Years)	Average Remaining Useful Life (Years)	Percent of Average Useful Life Remaining (Years)
Vertical (Treatment/Pumping/Storage)			
Facilities	60 to 130	22	25%
Fleet	12 to 25	12	52%
Linear (Distribution)			
Watermains	100	56	56%
Water Services	75	24	32%
Ancillaries	60	31	52%
Water Meters	20	12	60%
Communication Devices	30	5	83%

2.4 OVERALL ASSET CONDITION

The water assets are currently rated overall in good condition. Where condition inspections have not been completed, age-based ratings were used, and this is particularly applicable to linear assets which are difficult to physically inspect due to location.

Based on replacement cost, 71% or $733,508,000 of the total overall assets are rated as being in good condition and 29% or $302,488,000 are rated to be in fair condition. The overall asset condition ratings are based on the summary of the vertical and linear conditions which are summarized in more detail in Sections 2.5

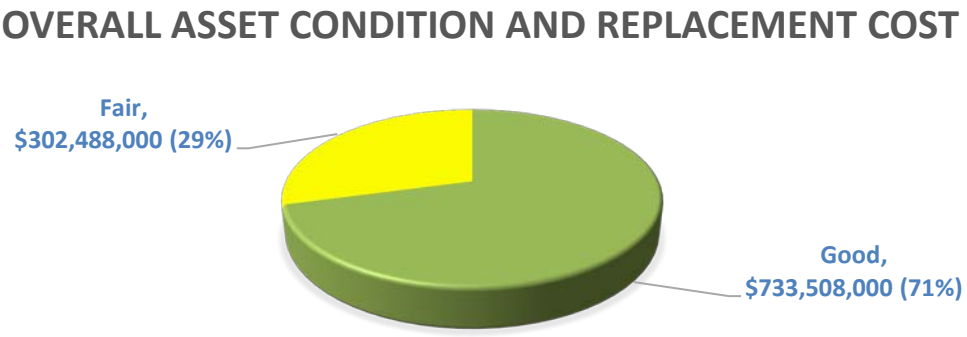
and 2.6 and have been calculated using weighted averages based on the respective asset replacement value.

Table 6 and Figure 2 below provide condition details and associated replacement costs of the water assets as a whole.

Table 6: Overall Asset Condition Ratings

Asset Class and Sub-Class	Asset	2022 Condition Rating
Vertical (Treatment/Pumping/Storage)		
Facilities	All Facilities	**Fair**
Fleet	Vehicles, Backhoes, Trucks	**Good**
Linear (Distribution)		
Watermains	All Sizes	**Good**
Water Services	All Sizes	**Fair**
Ancillaries	Valves (including chambers)	**Good**
	Hydrants	**Good**
Water Meters	All Sizes	**Good**
Communication Devices	All Types	**Good**

Figure 2: Overall Distributed Condition and Replacement Cost



2.5 VERTICAL ASSETS – DETAILED INVENTORY, REPLACEMENT COST, USEFUL LIFE AND CONDITION

Vertical assets include the water treatment plant and all associated structures and appurtenances, as well as pumping stations, water storage facilities, the water street dam and pumphouse, and the bulk water fill station. The water fleet is also included in the vertical asset classification.

See Figure 3 and Table 7 below for a summary of the vertical asset inventory and associated replacement cost.

Figure 3: Summary of Vertical Asset Inventory and Replacement Cost

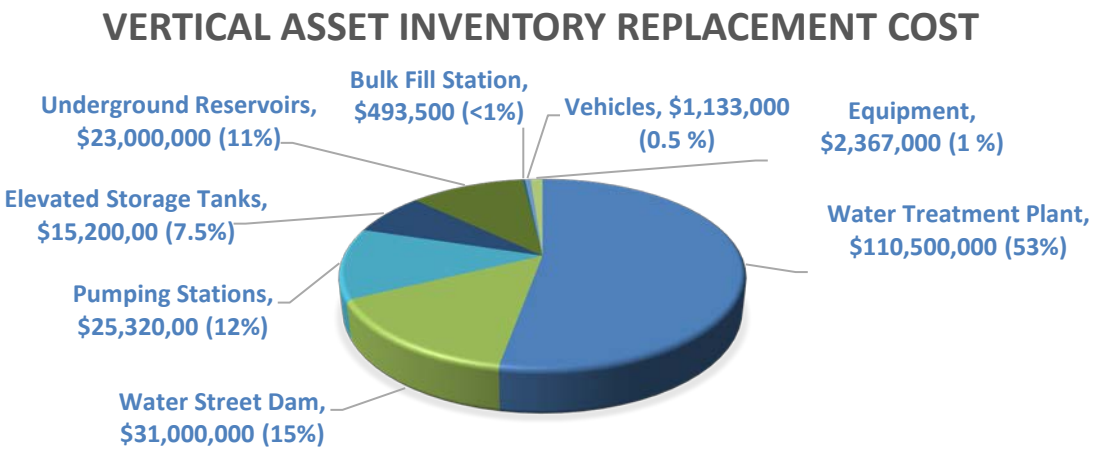


Table 7: Vertical Asset Inventory Replacement Cost Breakdown

Vertical Asset Class	Component	2021 Cost Breakdown
Water Treatment Plant	Filtration/Treatment Building	$88,000,000
	Waste Process Building	$12,500,000
	Generator Building	$10,000,000
Water Street Dam		$31,000,000
Pumping Stations	Water Street Pumphouse	$14,500,000
	Clonsilla Reservoir	$5,400,000
	Clonsilla (Zone 2)	$450,000
	Cumberland	$1,100,000
	Greencrest	$900,000
	Lansdowne	$650,000
	Chemong	$750,000
	Fairmount	$1,150,000
	Scollard	$420,000
Elevated Storage Tanks	High	$6,000,000
	Sherbrooke	$5,500,000
	Milroy	$3,700,000
Underground Reservoirs	Clonsilla	$12,000,000
	Towerhill	$11,000,000
Bulk Fill Station		$493,500
Vehicles	Light Duty Truck/Van	$838,000
	Heavy Duty Truck/Van	$295,000
Equipment	Heavy Equipment/Machinery	$1,908,500
	Miscellaneous Equipment	$458,500
TOTAL		**$209,013,500**

See Table 8 below for a summary of the vertical asset inventory and associated useful life.

Table 8: Vertical Asset Inventory Useful Life Breakdown

Vertical Asset Class	Component	Expected Useful Life (Years)	Construction Date	Average Remaining Useful Life (Years)	Percent of Useful Life Remaining (Years)
Water Treatment Plant	Filtration/ Treatment Building	130	1921	29	22%
	Waste Process Building	60	2003	42	70%
	Generator Building	60	2000	39	65%
Water Street Dam		100	1910	0	0%
Pumping Stations	Water Street Pumphouse	60	1910	0	0%
	Clonsilla Reservoir	60	1965	4	7%
	Clonsilla (Zone 2)	60	1965	4	7%
	Cumberland	60	2008	47	78%
	Greencrest	60	2017	56	93%
	Lansdowne	60	1974	13	22%
	Chemong	60	1981	20	33%
	Fairmount	60	1997	36	60%
	Scollard	60	1996	35	58%
Elevated Storage Tanks	High	100	1957	36	36%
	Sherbrooke	85	1972	36	42%
	Milroy	60	1987	26	43%
Underground Reservoirs	Clonsilla	60	1965	4	7%
	Towerhill	60	1986	25	42%
Bulk Fill Station		60	2020	59	98%
Vehicles	Light Duty Truck/Van	12	2014	5	42%
	Heavy Duty Truck/Van	12	2010	1	8%
Equipment	Heavy Equipment/ Machinery	25	2012	16	64%
	Miscellaneous Equipment	n/a	n/a	n/a	n/a

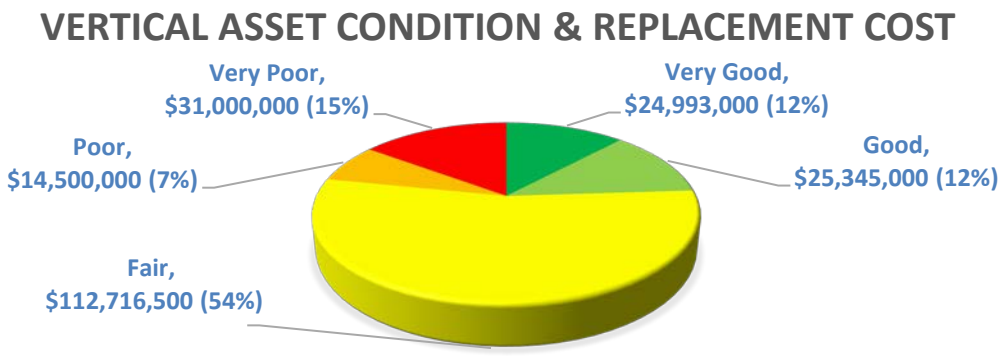
The condition of vertical assets has been verified in detail based on Condition Assessments performed by the PUC water engineering department, included in Appendix A and B. The Condition Assessments will be updated, at minimum, every five (5) years.

See Table 9 for a summary of the asset condition breakdown and Figure 4 for the asset condition and associated replacement cost below, respectively, for all vertical assets.

Table 9: Vertical Asset Inventory Condition Breakdown

Vertical Asset Class	Component	2022 Condition Rating
Water Treatment Plant	Filtration/Treatment Building	**Fair**
	Waste Process Building	**Very Good**
	Generator Building	**Very Good**
Water Street Dam		**Very Poor**
Pumping Stations	Water Street Pumphouse	**Poor**
	Clonsilla Reservoir	**Fair**
	Clonsilla (Zone 2)	**Fair**
	Cumberland	**Very Good**
	Greencrest	**Very Good**
	Lansdowne	**Good**
	Chemong	**Good**
	Fairmount	**Good**
	Scollard	**Fair**
Elevated Storage Tanks	High	**Good**
	Sherbrooke	**Good**
	Milroy	**Fair**
Underground Reservoirs	Clonsilla	**Fair**
	Towerhill	**Good**
Bulk Fill Station		**Very Good**
Vehicles	Light Duty Truck/Van	**Fair**
	Heavy Duty Truck/Van	**Fair**
Equipment	Heavy Equipment/Machinery	**Fair**
	Miscellaneous Equipment	n/a

Figure 4: Vertical Asset Condition and Replacement Cost



The majority of vertical assets are in fair condition (54%) with 22% in poor or very poor condition. The percentage of assets in poor to very poor condition are primarily due to the age of two (2) relatively high value vertical assets: the Water Street dam and associated pumphouse. A structural assessment of these two (2) facilities was completed in July 2017 and a detailed condition assessment (2022) for each facility is included in Appendix C.

2.6 LINEAR ASSETS – DETAILED INVENTORY, REPLACEMENT COST, USEFUL LIFE AND CONDITION

Linear assets include all underground infrastructure and associated items such as pipes, valves, chambers, water services as well as water meters and fire hydrants.

See Figure 5 and Table 10 below for a summary of the detailed linear asset inventory and associated replacement value.

Figure 5: Detailed Linear Asset Inventory and Replacement Value

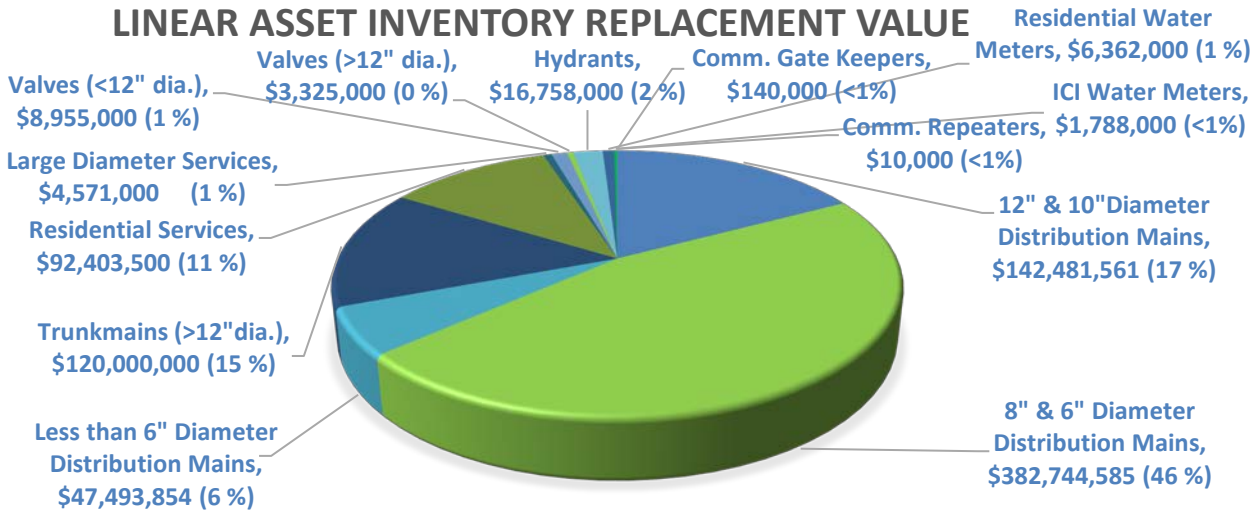


Table 10: Detailed Linear Asset Inventory and Cost Breakdown

Linear Asset Class	Asset Sub-Class	Size/Diameter (mm)	Quantity	2021 Cost Breakdown
Watermains	Distribution	300/250	110.5 km	$142,481,561
		200/150	273.8 km	$382,744,585
		<150	34.3 km	$47,493,854
	Trunk	>300	51.4 km	$120,000,000
Services	Residential	<50	27069 [1]	$92,403,500
	ICI	>50	653	$4,571,000
Ancillaries	Valves	<300	6805 [2]	$8,955,000
	Valves Including Chambers	>300	133	$3,325,000
	Hydrants	n/a	2,394	$16,758,000
Water Meters	Residential	<50	28240	$6,362,000
	ICI	>50	596	$1,738,000
Communication Devices	Repeaters	n/a	11	$10,000
	Gate Keepers	n/a	33	$140,000
Linear Asset Total				**$826,982,500**

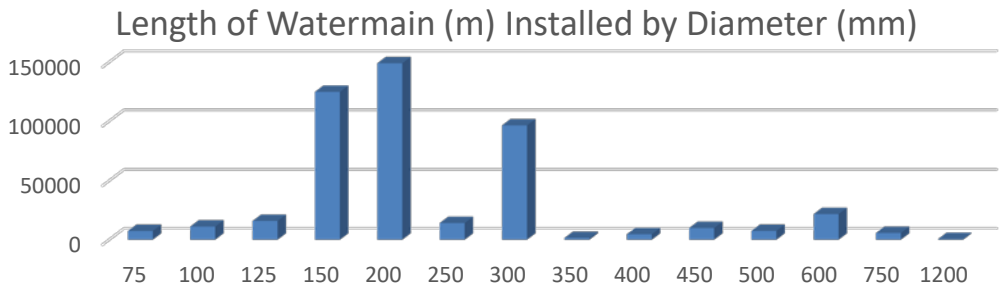
[1] Service records without size/age data were assumed to be less than 50 mm

[2] Valve records without size/age data were assumed to be less than 300 mm

As summarized above and in Figure 1 in Section 2.2, watermains account for a significant portion of the total water asset value at approximately 67%. As such, significant effort is put into comprehensive rehabilitation and maintenance of watermains in the distribution system. For detail of the various activities that are undertaken for watermain rehabilitation and maintenance, refer to Section 4.0.

For a detailed breakdown of the total length of watermain based on size (diameter), see Figure 6 below. The highest length of watermain by diameter is 200 mm, followed by 150 mm in the distribution system, as these two sizes provide water service to most residential areas as well as provide looping.

Figure 6: Summary of Watermain Length and Diameter



The expected useful life of linear assets has been developed using industry standards such as those published by the American Water Works Association (AWWA) and Ontario Water Works Associated (OWWA), in conjunction with staff experience and historical trends.

See Table 11 below for a summary of the linear asset inventory and associated average useful life.

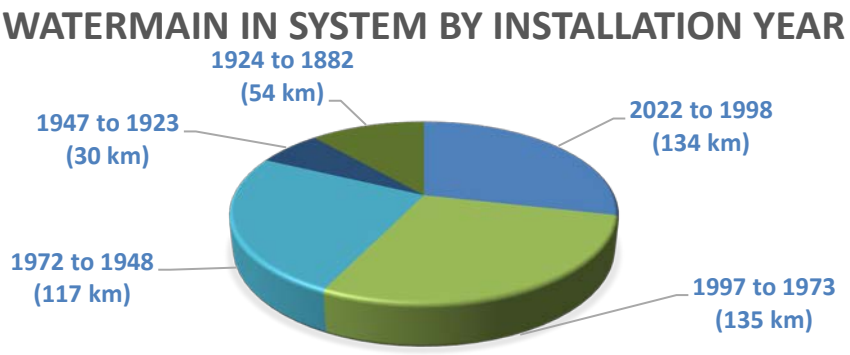
Table 11: Linear Asset Inventory Useful Life Breakdown

Linear Asset Class	Asset Sub-Class	Size/ Diameter (mm)	Expected Useful Life (Years)	Average Age (Years)	Average Remaining Useful Life (Years)	Percent of Useful Life Remaining (Years)
Watermains	Distribution	300/250	100	38	62	62%
		200/150	100	47	53	53%
		<150	100	68	32	32%
	Trunk	>300	100	56	44	44%
Services	Residential	<50	75	51	24	32%
	ICI	>50	75	42	33	43%
Ancillaries	Valves	<300	60	26	34	56%
	Valves Including Chambers	>300	60	52	8	14%
	Hydrants	n/a	60	27	33	54%
Water Meters	Residential	<50	20	9	11	55%
	ICI	>50	20	7	13	66%
Communication Devices	Repeaters	n/a	30	5	25	83%
	Gate Keepers	n/a	30	4	26	87%

See Figure 7 below for a detailed summary of the length of watermain in the distribution system as a function of installation year. As the figure shows, approximately 269 km (57%) of the total watermain length of 470 km has been installed since 1973. This 269 km of watermain is currently estimated to have only

consumed 50% of its expected useful life (100 years) as summarized in Table 11 above.

Figure 7: Length of Watermain by Installation Year



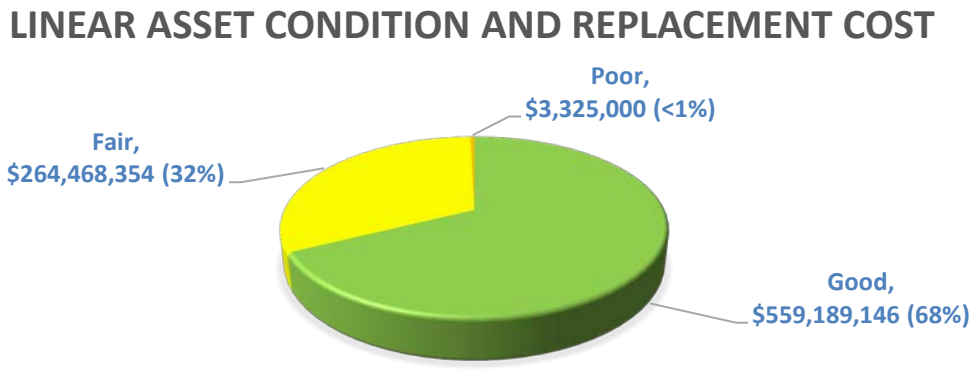
The condition of linear assets is difficult to physically verify due to location, as most of the assets in this category, such as watermains and services, are buried. The condition of linear assets has been estimated using a combination of industry standards, physical inspections where possible, age, repair history (as applicable) and material.

See Table 12 for a summary of the asset condition breakdown and Figure 8 for the asset condition and associated replacement cost below, respectively, for all linear assets.

Table 12: Linear Asset Inventory Condition Breakdown

Linear Asset Class	Asset Sub-Class	Size/Diameter (mm)	2022 Condition
Watermains	Distribution	300/250	**Good**
		200/150	**Good**
		<150	**Fair**
	Trunk	>300	**Fair**
Services	Residential	<50	**Fair**
	ICI	>50	**Fair**
Ancillaries	Valves	<300	**Good**
	Valves Including Chambers	>300	**Poor**
	Hydrants	n/a	**Good**
Water Meters	Residential	<50	**Good**
	ICI	>50	**Good**
Communication Devices	Repeaters	n/a	**Good**
	Gate Keepers	n/a	**Good**

Figure 8: Linear Asset Condition and Replacement Cost



The majority of linear assets are estimated to be in good condition, and this aligns with the number of annual watermain breaks per kilometer and water service repairs outlined in Table 13 in Section 3.0.

3.0 LEVELS OF SERVICE

This section presents levels of service as they are currently being provided by PUC.

Key performance indicators, current measures, and targets for the water service area, are outlined in Table 13 below. Comparing the measures to the targets indicates how well the water utility is performing and helps confirm the effectiveness of the overall asset management program. Targets have been set based on industry standards as well as staff experience and statistics specific to the Peterborough water system.

Table 13: Key Performance Indicators, Current Measures and Targets

Key Performance Indicator	Current Measure 2021	Target
Annual number of adverse drinking water quality notifications	1[1]	0
Annual number of water quality complaints (colour/taste, etc.)	20	<50
Number of days a boil water advisory issued by Medical Officer of Health – Annual	0	0
Ministry of Environment Drinking Water Inspection Report Rating (most recent)	100%	100%
Number of watermain breaks per 100km of watermain per year	5.5	<8
Number of water service failures per year	70	<75
Water Utility Master Plan - Maturity	4 years	5 years
Condition Assessment of Treatment Plant – Maturity	0 years	5 years
Condition Assessment of Pumping Stations – Maturity	0 years	5 years
Condition Assessment of Water Storage Facilities – Maturity	0 years	5 years

[1] Upon secondary sampling, adverse result was attributed to sampling error

Table 5 of O. Reg. 588/17 provides technical levels of service that are required to be reported on in order to meet the provincial level of service requirement. These metrics for the Peterborough water system are summarized below in Table 14.

Table 14: Mandatory Technical Levels of Service

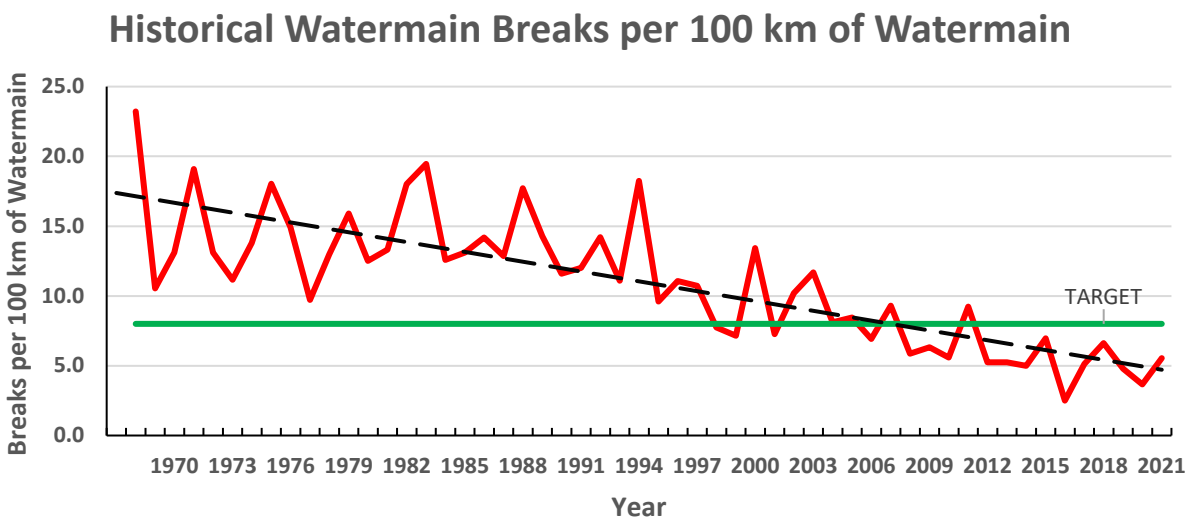
Service Attribute	Technical Levels of Service	Measure
Scope	Percentage of properties connected to the municipal water system	92.4%
	Percentage of properties where fire flow is available	93.5%
Reliability	The number of connection-days per year where a boil water advisory notice is in place compared to the total number of properties connected to the municipal water system	0 connection-days of 27,722 connected properties
	The number of connection-days per year due to watermain breaks compared to the total number of properties connected to the municipal water system	3.25 connection-days of 27,722 connected properties

One of the most important performance indicators in a water system is the number of watermain breaks, which is commonly measured yearly per 100 km of watermain in the distribution system. The most recent measure of yearly watermain breaks per 100 km is 5.5 (2021) as shown in Table 13, however due to the variability of winter temperatures and fluctuations it is important to track historical watermain breaks to identify trending.

Based on an analysis of watermain breaks per 100 km of watermain from 1968, the overall trend is reducing. This can be partially attributed to effective asset management; however other factors also impact this performance indicator including how much new watermain is constructed over time as well as advances in material technology.

See Figure 9 below for a summary of the historical watermain breaks per 100 km of watermain since 1968, showing the overall trend in the black line. The target of 8 breaks per 100 km of watermain is included in Figure 9 for reference, which is considered below industry average and is somewhat aggressive given the age of the Peterborough water distribution system.

Figure 9: Historical Watermain Breaks per 100km of Watermain



4.0 ASSET MANAGEMENT STRATEGIES

4.1 ASSET MANAGEMENT LIFECYCLE STRATEGIES

PUC carries out various strategies and activities to maintain current levels of service and maintain/extend the useful life of water assets. This section describes the preferred current asset management strategies as well as a brief description of cement mortar lining of watermains and the internal Condition Rating Analysis Tool program.

Assessment and evaluation of which major lifecycle activities that could be undertaken, considering associated risks, benefits and costs, are explored and analyzed through various studies and reports including the Water Utility Master Plan.

Where studies have not been completed to access lifecycle strategy options, an analysis is carried out on a case-by-case basis by staff when developing water utility spending strategy and budget forecasts.

Table 15 below shows a summary of the current asset management strategies, activities, and practices that are in place. These consider the useful life of the assets and assumes the investment costs over the lifecycle of the assets including capital, operating and other relevant costs.

Table 15: Asset Management Lifecycle Strategies

Strategy Type	Current Practice
Non-infrastructure Solutions Actions or policies that can lower costs or extend asset life	• Use of water modeling software to optimize relationship between water distribution system capacity and pipe size • Water engineering design standards available to developers and other stakeholders, updated regularly • Internally developed scoring system for watermains to prioritize replacement considering age, break history and material • Annual hydrant flow testing program to confirm available water flow rates and pressures • Pilot testing facility at water treatment plant to optimize existing processes and investigate options to improve water quality and reduce costs • Adherence to Water Utility Master Plan which provides overall road map for future water system needs and upgrades • Annual training and education for key staff to keep up-to-date on industry best practices and further develop skills

Strategy Type	Current Practice
	• Metered water required for all water system users to encourage water conservation and allow water balanced calculations to determine non-revenue water • Equipment calibrations (flow meters, analyzers) conducted at various intervals • SCADA monitoring of equipment hour runtime and data input into maintenance software • Identification of critical control points through Drinking Water Quality Management system • Redundancy built into various equipment and processes that lessens the frequency and impact of failure
Maintenance Activities Activities include regularly scheduled inspection and maintenance, or more significant repair and activities associated with unexpected events	• Annual valve operating program to exercise valves, promoting longevity and ensuring function • Annual hydrant sand blasting and painting program • Annual hydrant inspection and repair • Annual flushing program of dead ends to promote water quality • Annual air release valve maintenance • Installation of new sacrificial anode on iron watermains during repair activities • Various records at water treatment plant are maintained in Data Stream MP2 maintenance program o Work orders are created for reactive and preventative maintenance activities o Run hours of pumps are maintained and identify certain actions required • Defective equipment document is created when a maintenance issue arises. Document is reviewed and work orders are created to address the issue and work orders are logged in the MP2 program. • Annual inspections of intake structures • Preventative annual maintenance on chemical feed systems • Semi-annual inspections of underground pumping stations and reservoirs • As per best practices, every effort is made to enter and inspect reservoirs and elevated tanks every five (5) years • Annual filter maintenance program that inspects filter media, gravel, sand, including annual rate of flow, loss of head, meters and operating cylinders and valves

Strategy Type	Current Practice
Rehabilitation Activities that extend the useful life of an existing asset	• Cement mortar lining program to extend lifespan of cast iron watermains • Structural lining program to extend lifespan of watermain in challenging locations for excavation • Water service repairs to valves at property line • Process pipe painting at various facilities to prevent corrosion • Through maintenance programs and visual inspections/history of equipment failures, rehabilitation projects are identified at water treatment plant • Use of external experts, when required, to review rehabilitation requirements of various facilities as needed
Replacement Activities that occur once an asset has reached the end of its useful life and cannot be rehabilitated	• Replacement of existing watermain and water services at end of lifespan • Replacement projects are prioritized that combine with other projects or utilities to reduce costs and impacts to the public • Through maintenance programs and visual inspections/history of equipment failures, replacement projects are identified at water treatment plant

4.2 RISKS ASSOCIATED WITH STRATEGIES

Potential risks associated with the ability to effectively deliver established service levels are:

- Insufficient funding levels
- Insufficient staffing and resources to responsibly implement lifecycle strategies
- Asset deterioration assessments/models are underestimated/miscalculated
- External/environmental factors such as climate change effects (more severe weather instances, increased demands due to growth)

Impacts associated with above risks include:

- Further/accelerated asset deterioration
- Increased backlog of work
- Increased treatment costs
- Level of treatment changes requiring increased resources/costs (maintenance now needing replacement)
- Planned budget/needs forecast not reflective of actual asset needs

- Additional assets/expansion of services required
- Reputation/image negatively affected

Risks relating to asset failure are mitigated through inspection and maintenance programs, predictive failure modeling, climate change adaptation and mitigation strategies and investment planning to achieve the levels of service that have been established.

Strategies implemented are primarily at the lowest cost in order to reduce the burden on the water rate payers in order to maintain the current levels of service at the lowest risk.

4.3 CEMENT MORTAR LINING OF WATERMAINS

As the cast iron and unlined ductile iron pipe in the water distribution system age, the interior of the pipe develops significant corrosion which results in pitting, tuberculation, and roughness inside the pipe. See Figure 10 below for an example of a highly tuberculated cast iron pipe.

Figure 10: Cast Iron Pipe Tuberculation

When pressure and flow fluctuate, particulates due to corrosion can break away from the wall of the pipe and into the flow, causing discolouration and other aesthetic issues within the water. Internal corrosion also significantly contributes to pipe failure. Cement Mortar Lining (CML) of iron watermains provides a smooth inner lining which eliminates the roughness, reduces future corrosion potential, and helps minimize associated water quality issues.

Additional benefits of CML are improved hydraulic properties of the pipes (better water flow, lower pumping costs), and internal pipe corrosion is inhibited by the CML which adds considerably to the life of the pipe. Depending on the age, condition, and physical properties of the pipe, CML can add an estimated 30 years to the useful life of watermain. An important advantage of the CML program is improved customer satisfaction and fewer subsequent customer complaints.

Figure 11 below illustrates the final internal pipe condition following cement mortar lining.

Figure 11: Cement Mortar Lined Watermain

4.4 CONDITION ASSESSMENT RATING TOOL

The Condition Rating Analysis Tool (CART) program is an internal scoring system and methodology developed by the PUC Water Engineering department. The CART program uses data which is continuously collected and updated by PUC staff and can be accessed in either graphical or tabular form. The CART program greatly aids in identifying candidate locations for watermain replacement or rehabilitation. The overall process is shown graphically as a flow chart in Appendix D for reference.

The program uses the GIS database to evaluate a series of criteria to establish whether a pipe is a candidate for replacement or rehabilitation. Staff then review the candidate pipes data, the graphical break history data, and make a determination of the most favourable candidate pipes. The detailed process of the program is described below:

Replaced VS Lining Candidacy Criteria

The Condition Rating Analysis Tool first determines whether a section of pipe is a candidate for replacement. A section of pipe is a candidate for replacement if it meets any of the following three (3) flags:

1. If the pipe (‘link’) is older than the expected service life (100 years generally);
2. If the link failure rate indicates an increasing breakage rate per year; or
3. If the pipe material is composed of non-ferrous material: hypertech, fibre reinforced cement, or asbestos-cement.

Failing to meet any of the above criteria, it is then assessed to see if it is a candidate for cement-mortar lining to address water quality and flow characteristics. The pipe link is assessed as a candidate for lining if:

1. It is unlined cast iron or unlined ductile iron, and
2. the pipe diameter is greater than 125 mm (5”) (in most situations, note that lining of 125 mm and 100 mm watermain is possible but more difficult).

Link Replacement Prioritization

The priority of a pipe link destined for replacement is established based on a numerical rating system based on five (5) factors. Those factors are pipe age, material type, link failure trend, whether the pipe has corrosion protection, and the number of customers who would be interrupted by a pipe failure.

Link Lining Prioritization

A pipe that is a candidate for internal lining is currently prioritized based on a numerical rating system that considers the following factors:

1. Age of the pipe,
2. Diameter of the pipe, and
3. Unlined pipe.

5.0 LIFECYCLE STRATEGIES COSTS

Capital and operating costs for the water utility are reviewed and approved yearly through the Water Utility Commission, which is typically comprised of the mayor of the City of Peterborough as Chair and various city councillors as members.

A copy of the 10-Year Financial Plan (2021) is included in Appendix E. The 10-year approved (2021) annual cost forecasts associated with the lifecycle strategies presented in Section 4.1, the Water Utility Master Plan, the City's adopted Official Plan, and the Growth Plan for the Greater Golden Horseshoe are summarized below in Table 16.

Table 16: 10-Year Lifecycle Strategies Cost

Year	Lifecycle Strategies Costs	
	Operating Costs [1]	Capital Costs [2]
2022	$8,939,000	$9,602,500
2023	$9,208,000	$10,440,000
2024	$9,484,000	$7,160,500
2025	$9,768,000	$8,071,000
2026	$10,061,000	$11,239,500
2027	$10,363,000	$9,446,500
2028	$10,674,000	$9,835,000
2029	$10,994,000	$10,087,000
2030	$11,349,000	$11,963,000
2031	$11,690,000	$10,152,000

[1] Water System Financial Plan, March 25, 2021 (Appendix E)
[2] 10 Year Water Capital Program

6.0 ASSET MANAGEMENT – RISKS AND CLIMATE CHANGE

The impacts of climate change highly influence the overall asset management strategy and associated decision making, and directly correlate with many risks faced by all water utilities.

A risk assessment analysis for the Peterborough water system has been developed under the PUC Drinking Water Quality Management System (DWQMS) and includes risks associated with or impacted by climate change. The risk assessment is comprehensively reviewed annually by PUC top management. A copy of the 2022 risk assessment is included in Appendix F for reference.

Risks have been identified and rated based on three (3) criteria - likelihood, impact, and level of risk, respectively. For a description of the three (3) risk assessment criteria used, see Tables 17, 18, and 19 below respectively.

Table 17: Summary of Likelihood Criteria

Level	Descriptor	Example Description
A	Almost certain	Is expected to occur in most circumstances
B	Likely	Will probably occur in most circumstances
C	Possible	Might occur at some time/the event should occur at some time
D	Unlikely	Could occur at some time
E	Rare	May occur only in exceptional circumstances

Table 18: Summary of Impact Criteria

Descriptor	Example Description
Insignificant	Insignificant impact, little disruption to normal operation, low increase in normal operation costs
Minor	Minor impact for small population, some manageable operation disruption, some increase in operating costs
Moderate	Minor impact for large population, significant modification to normal operation but manageable, operation costs increased, increased monitoring
Major	Major impact for small population, systems significantly compromised and abnormal operation if at all, high level of monitoring required
Catastrophic	Major impact for large population, complete failure of systems

Table 19: Summary of Level of Risk Criteria

Likelihood	Consequences				
	1 Insignificant	**2** Minor	**3** Moderate	**4** Major	**5** Catastrophic
A – Almost Certain	Moderate	High	Very High	Very High	Very High
B – Likely	Moderate	High	High	Very High	Very High
C – Possible	Low	Moderate	High	Very High	Very High
D – Unlikely	Low	Low	Moderate	High	Very High
E – Rare	Low	Low	Moderate	High	High

7.0 SUMMARY

The PUC has been managing and operating the Peterborough water system for over 100 years. Since the inception of PUC, asset management has been a core function of the utility through ensuring that the water utility is operated effectively, efficiently, safely, and reliably.

The Plan provides detailed information on the framework for managing all water assets in the City of Peterborough, as well as key metrics to measure effectiveness and long-term sustainability. The Plan will be reviewed and updated in future iterations, incorporating new best practices, strategies, and recommendations over time as well as tracking new assets, conditions, and rehabilitation/replacement efforts.

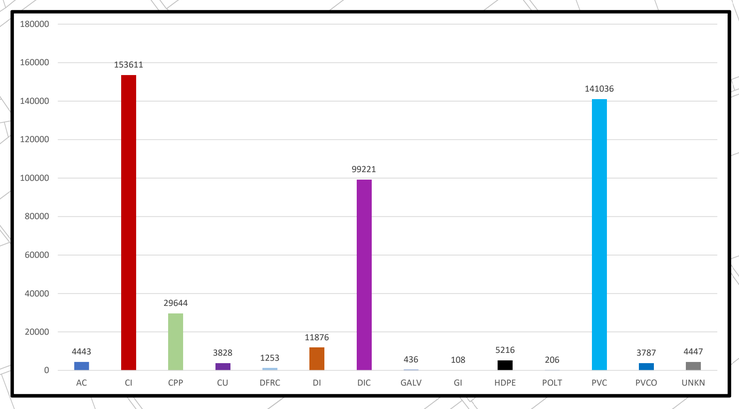
The majority of water infrastructure (71%) is in good condition, as described in Figure 2 in Section 2.4. Even though the overall asset condition is considered to be good, there are several assets that are in poor to very poor condition that require rehabilitation or replacement prioritization in the coming years. Diligence and continued use of asset management planning is required to ensure that the financial allocation of resources continues to keep the water assets in overall good condition while reducing risks and minimizing operating costs.

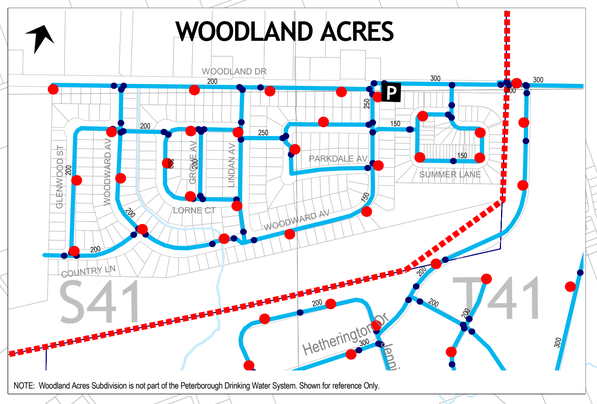
8.0 APPENDICES

Appendix A: 2023 Water Distribution System Map
Appendix B: Condition Assessments for Water Treatment Plant
Appendix C: Condition Assessments for Major Vertical Infrastructure
Appendix D: Water Distribution Condition Assessment Rating Tool Flowchart
Appendix E: 2021 Water System Financial Plan
Appendix F: 2022 DWQMS Risk Assessment

9.0 AMENDMENTS/REVIEWS

Date *(yyyy-mm-dd)*	Section Amended	Comments	Author
2023-03-24	1.5 4.1 4.2	New paragraph inserted New paragraphs inserted New section inserted	M. Meyers
2024-03-20	2.1 2.2 2.3 2.4 2.6 8.0	Table 3 - Asset Added Figure 1 – Asset Added Table 4 – Asset Added Table 5 – Asset Added Table 6 – Asset Added Figure 2 – Asset Added Table 10 – Asset Added Table 11 – Asset Added Table 12 – Asset Added Appendix A – Asset Added	J. Sayles





STORAGE

Clonsilla 18.18 ML
High Water Level = 214.6m
Low Water level = 209.1m
Ground Elevation = N/A

High Street 4.5 ML
High Water Level = 252.8m
Low Water level = 245.2m
Ground Elevation = 224m

Milroy 0.45 ML
High Water Level = 317.0m
Low Water level = 311.9m
Ground Elevation = 275.5m

Sherbrooke 2.72 ML
High Water Level = 317m
Low Water level = 305.3m
Ground Elevation = 283m

Towerhill 22.73 ML
High Water Level = 287.7m
Low Water level = 282.2m
Ground Elevation = N/A

Peterborough Utilities Commission

2023 WATER DISTRIBUTION SYSTEM

1:12,000
0 1 2
Kilometers

Legend

Water Meter Gatekeeper
Water Meter Repeater
Elevated Tank
Buried Reservoir
Pump Station
Water Treatment Plant
Loop Service

Produced by the Peterborough Utilities Engineering Department. Water System data derived from the GIS warehouse
Updated to the completion of the received March 31 2023 construction As-Builts.
ERRORS and OMISSIONS. Bring any verified errors and omissions to Engineering GIS for revisions. D3906

ASSET MANAGEMENT
INSPECTION SUMMARY

Peterborough Water Treatment Plant

1230 Water Street North, Peterborough ON

Peterborough Utilities Commission

October 2022

UTILITIES
PETERBOROUGH
COMMISSION

WATER
RIVERVIEW PARK AND ZOO

Peterborough Utilities Commission

1867 Ashburnham Drive, Peterborough, Ontario

Partners in Peterborough Green-Up

Asset Management Inspection Results – 2022

BUILDING: Peterborough Water Treatment Plant **ADDRESS**: 1230 Water St N.

BUILT: 1922, Additions in 1952, 1967, 1997, 2000, 2003 and 2017

LATITUDE: 44.339905° **LONGITUDE:** 78.311691°

GENERAL OVERVIEW

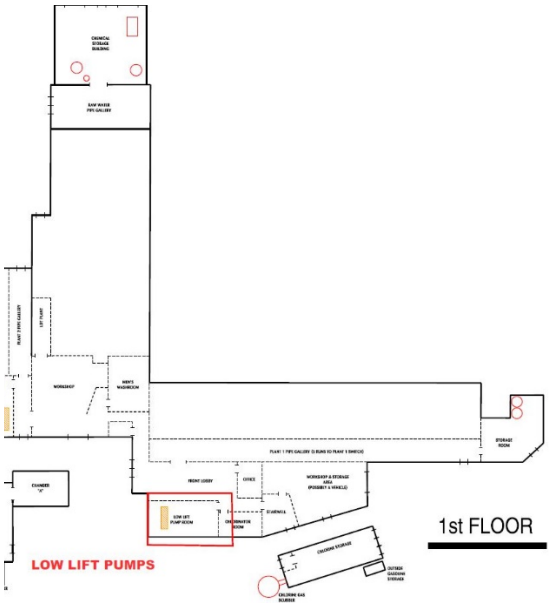
The Peterborough Water Treatment Plant is located at 1230 Water Street North in the City of Peterborough. The treatment plant shares its property with the Riverview Park and Zoo (RPZ).

The main building contains the bulk of the treatment process and is separated into two (2) distinct 'plants', based on the year of construction. It also has a fully equipped laboratory for onsite sampling and testing. The Water Treat Plant employs twelve (12) lab technicians to gather samples, city wide, and complete the required testing. A fully furnished machine shop is also on the premises with a staff of seven (7), to complete routine maintenance and repairs on the WTP, reservoirs, pumping stations and elevated tanks. The manager, two (2) supervisors and an administrative assistant each have offices at the treatment plant.

A major expansion occurred in 1952, consisting of the addition of filter beds #7, 8 and 9 and an expansion to the laboratory and Operator Control Room. In 1967, Plant #2 filter beds were constructed, and the flocculation tanks were added to plant #1. In 1997, the flocculation tanks and sedimentation basins for Plant #2 were added, along with chlorine contact tank #1 and the conversion of the original reservoir to clearwell #1. The generator house was constructed in 2000 and is located on the south side of the main plant. A process waste plant was constructed in 2003 and is located on the west side of the main plant. The chlorine contact tank and clearwell underwent a major rehabilitation and expansion in 2017.

SUMMARY TABLE

SPECIFIC AREA	REFERENCE	CONDITION
Low Lift Pumps	Appendix B.1.1	Poor
Coagulant and Chemical Storage	Appendix B.1.2	Good
Flocculation Tanks and Sedimentation Basins	Appendix B.1.3	Fair
Filtration Beds	Appendix B.1.4	Fair
Filtration Piping Gallery	Appendix B.1.5	Fair
High Lift Back-up Generator – Piping	Appendix B.1.6	Fair
Chlorine Storage and Injector Room	Appendix B.1.7	Good
Chlorine Contact Tank and Clearwells	Appendix B.1.8	Good
Overall Building and Office Space	Appendix B.1.9	Fair
Pilot Plant	Appendix B.1.10	Good
OVERALL		**Fair**



ASSET MANAGEMENT INSPECTION REPORT

Low Lift Pumps – Peterborough Water Treatment Plant

1230 Water Street North, Peterborough ON

Peterborough Utilities Commission

August 2022

Inspector: J. Sayles

UTILITIES PETERBOROUGH COMMISSION

WATER
RIVERVIEW PARK AND ZOO

Peterborough Utilities Commission

1867 Ashburnham Drive, Peterborough, Ontario

Partners in Peterborough Green-Up

Asset Management Inspection Results – 2022

BUILDING: Low Lift Pumps, Water Treatment Plant

ADDRESS: 1230 Water St N.

BUILT: 1922

SERVICE: Water Treatment Plant

LATITUDE: 44.340028°

LONGITUDE: 78.311452°

PUMPS: 131.5L/s @ 21.3TDH,
438.1 L/s @ 18.3TDH,
525.75 L/s @ 18.9TDH,
613.4 L/s @ 18.9TDH

CONTROLS: SCADA

OVERALL CONDITION: POOR

BUILDING AND PROCESS STRUCTURAL – POOR CONDITION

The intake pipe, wet well and low lift pumps are located on the east side of the original water treatment plant that was constructed in 1922. There have been very little upgrades to the piping or pumps. The wet well access room underwent major concrete repair work in 2019. There have been several renovations completed to the facility to accommodate changes in health and safety policies, with many handrails and platforms installed and updated. No structural changes have been made to the facility and it appears to be in fair condition. There are several visual issues with the facility that are consistent with other facilities of this age (100+ years).

BUILDING ARCHITECTURAL – POOR CONDITION

The low lift pump area is a multilevel facility with the diesel motor on the 1st floor ground level. The generator platform is below the ground level and above the intake pipe and wet wells. The wet wells are below grade and are at the same elevation as the Otonabee River. The intake is gravity fed and does not require pumping to the wet wells.

BUILDING SERVICES – FAIR CONDITION

The low lift pump area is heated and overhead fluorescent lighting throughout. The main door to the area is secured with a keycard and keyed doorknob set. Access to this area is restricted to the public. A raw water sample pump and the Pilot Plant raw water supply pump are also located at the wet well access.

PROCESS PIPING – FAIR CONDITION

The intake piping from the Otonabee River is original from 1922. The piping between the wet well and the low lift pumps has been replaced. An abandoned pipe is still housed within the wet well area. No deficiencies with respect to the piping were observed at the time of the inspection.

PROCESS MECHANICAL – FAIR CONDITION

The pumps, check valves and piping are in fair condition.

PHOTOS

Figure 1: Intake Wet Well

Figure 2: Intake Piping between wet well and low lift pumps

Figure 3: Electric Low Lift Pump #2

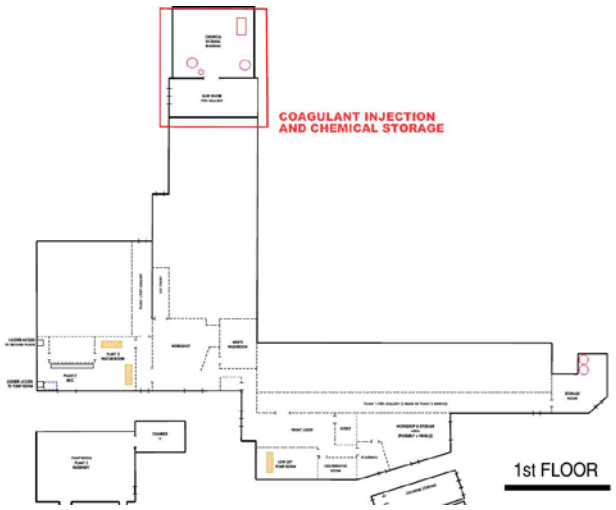
Figure 4: Diesel Powered Low Lift Pump #3

Figure 5: Electric Low Lift Pump #4

Figure 6: Electric Low Lift Pump #1

Figure 7: Low Lift Pump MC

Figure 8: Vacuum Pumps, 1 duty, 2 standby



ASSET MANAGEMENT INSPECTION REPORT

Coagulant Injection and Chemical Storage – Peterborough Water Treatment Plant

1230 Water Street North, Peterborough ON

Peterborough Utilities Commission

August 2022

Inspector: J. Sayles

UTILITIES
PETERBOROUGH
COMMISSION

WATER
RIVERVIEW PARK AND ZOO

Peterborough Utilities Commission

1867 Ashburnham Drive, Peterborough, Ontario

Partners in Peterborough Green-Up

Asset Management Inspection Results – 2022

BUILDING: Coagulant Injection and Chemical Storage, Water Treatment Plant

ADDRESS: 1230 Water St N.

BUILT: 2000

SERVICE: Water Treatment Plant

LATITUDE: 44.340188°

LONGITUDE: 78.312388°

TANKS: Sodium Hydroxide - 30,000L

Fluoride – 25,000L

Coagulant – 3 x 18,000L

CONTROLS: SCADA

OVERALL CONDITION: GOOD

BUILDING AND PROCESS STRUCTURAL – VERY GOOD CONDITION

The coagulant injection raw water piping gallery and the chemical storage was constructed in 2000. Prior to the addition, the coagulant was injected post the low lift pumps and wet well area. The building is in excellent condition with no concerns identified at the time of the inspection.

BUILDING ARCHITECTURAL – FAIR CONDITION

The coagulant injection area is located below grade, the Fluoride and Sodium Hydroxide storage is at grade and the coagulant storage is on the second floor. No deficiencies were identified at the time of inspection.

BUILDING SERVICES – GOOD CONDITION

No deficiencies in lighting, or heating were observed in the station. Access is through a locked smart key doorknob set or a keycard. The refilling dock is immediately to the east of the building in a fenced area. At the time of inspection, all services related to the building appeared to be in good condition. Spill kits and wash stations are clean and readily available.

PROCESS PIPING – GOOD CONDITION

Piping in the coagulant injection gallery is stainless steel. All piping is original from 2000. All piping and bends are in good condition. No deficiencies were observed at the time of the inspection.

PROCESS MECHANICAL – GOOD CONDITION

The chemical pumps are in good condition. Standby pumps are available for redundancy purposes. Duty and standby mixers are both in good condition.

PHOTOS

Figure 1: Below Grade Level, Raw Water Piping

Figure 2: Raw Water Piping, Coagulant Injection Point and Mixer

Figure 3: Post Coagulant Injection, mixers, foreground and background

Figure 4: 30,000L Sodium Hydroxide Storage Tank

Figure 5: Sodium Hydroxide Pumps, Piping and Controls

Figure 6: 25,000L Fluoride Storage Tank

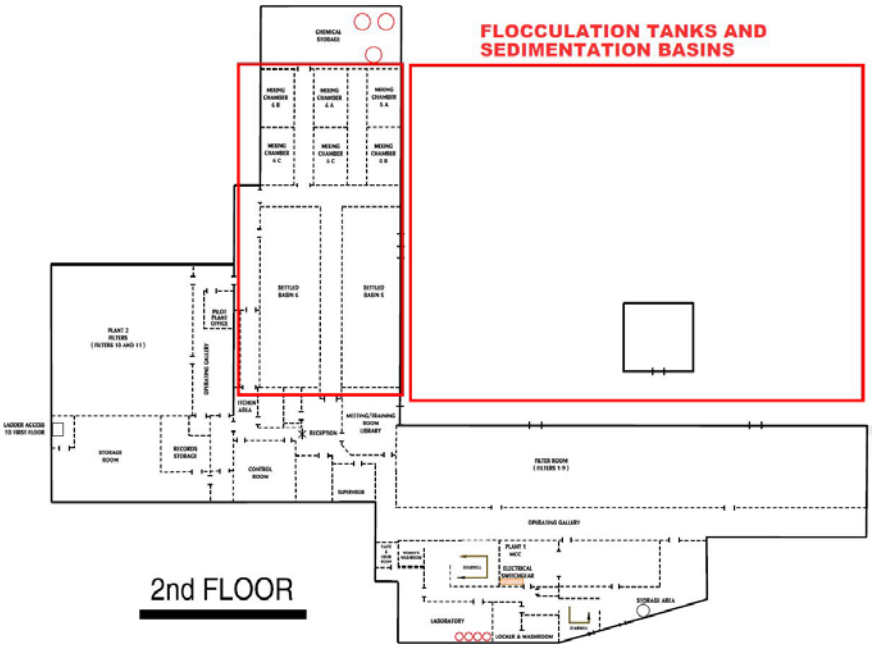
Figure 7: Fluoride Pumps, Piping and Controls

Figure 8: 3x 18,000L Coagulant Tanks

Figure 9: Coagulant Pumps, Piping and Controls

Figure 10: Post Coagulant Injection Piping to Flocculation Tanks

Figure 11: Outside Loading Area for Chemicals



ASSET MANAGEMENT INSPECTION REPORT

Flocculation Tanks and Sedimentation Basins – Peterborough Water Treatment Plant

1230 Water Street North, Peterborough ON

Peterborough Utilities Commission

August 2022

Inspector: J. Sayles

UTILITIES
PETERBOROUGH
COMMISSION

WATER
RIVERVIEW PARK AND ZOO

Peterborough Utilities Commission

1867 Ashburnham Drive, Peterborough, Ontario

Partners in Peterborough Green-Up

Asset Management Inspection Results – 2022

BUILDING: Flocculation Tanks and Sedimentation Basins, Water Treatment Plant

ADDRESS: 1230 Water St N.

BUILT: 1922 and 1997

SERVICE: Water Treatment Plant

LATITUDE: 44.340232°

LONGITUDE: 78.311910°

FLOCCULATION TANKS: One System of four (4) tanks with a total rated capacity of 50,000 m^3/day (below grade)
One System of two (2) tanks with a total rated capacity of 54,000 m^3/day

SEDIMENTATION BASINS: One System rated at 50,000 m^3/day (below grade)
One System rated at 54,000 m^3/day

OVERALL CONDITION: FAIR

BUILDING AND PROCESS STRUCTURAL – FAIR CONDITION

The flocculation tanks and sedimentation basins are divided into two distinct systems based on the year of install. There are 6 flocculation tanks below grade and are in the northwest corner, outside of the treatment plant. The associated sediment basins (1-4) are east of the flocculation tanks. This system was constructed in 1922 and 1967 and feed Plant #1. Flocculation tanks 5 and 6 are inside of the treatment plant and were constructed in 1997 and feed Plant #2. In recent years the earth above sedimentation basins 1 and 2 has been removed to reduce the dead load on the underground tanks. No structural changes have been made to the below grade tanks and they appear to be in fair condition based on routine inspections. No concerns were identified on the surface surrounding the below ground tanks. There are several access hatches to enter the below grade tanks. Flocculation tanks 5 and 6 and sedimentation tanks 5 and 6 appear to be in good condition at the time of the inspection.

BUILDING ARCHITECTURAL – GOOD CONDITION

The below grade flocculation tanks and sedimentation basins were installed in 1922. A condition survey was completed in 1990. The report indicated that the top slab was showing signs of stress. The earth above the tank was removed to lessen the dead load on the tank. The addition that houses the Flocculation tanks and sedimentation basins 5 and 6 was constructed in 1997 and is in good condition. No deficiencies were identified during the inspection.

BUILDING SERVICES – FAIR CONDITION

No deficiencies in power supply, lighting, or heating were observed in the flocculation tanks and sedimentation basin areas. The below grade tanks are accessible through hatches above grade. The underground facility was not inspected at this time. At the time of inspection, all services related to the building appeared to be in fair condition.

SITE WORKS – GOOD CONDITION

The surface of the underground facility is graded to allow surface runoff to be directed to a localized storm system. The sodded area above the underground facility was maintained and appeared to be in good condition.

PROCESS PIPING – UNKNOWN CONDITION

All piping associated with the flocculation tanks and sedimentation basins is buried and inaccessible for inspection. No deficiencies were known or observed at the time of the inspection.

PROCESS MECHANICAL – FAIR CONDITION

No concerns were identified or observed with the mechanical components of the flocculation tanks and sedimentation basins at the time of the inspection.

PHOTOS

Figure 1: Floc Tank 6B(foreground) and 6C (background)

Figure 2: Floc Tank 6A(foreground) and 5C(background)

Figure 3: Floc Tanks 5/6(foreground) and Sedimentation Basins 5/6(background)

Figure 4: Sedimentation Basin 6

Figure 5: Sedimentation Basin 5

Figure 6: Floc Tanks 5B(foreground) and 5A(background)

RIVE Partn

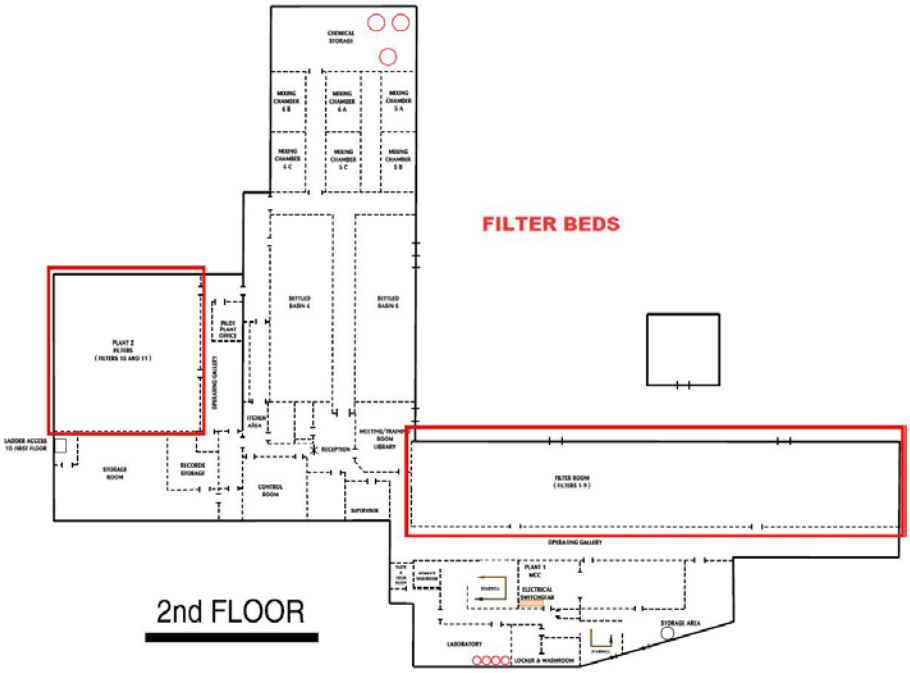
Figure 7: Sedimentation Basins 5 and 6 Controls

Figure 8: Sedimentation Basins 5 and 6 (foreground) and Floc Tanks 5A, 5B, 5C, 6A, 6B and 6C(background)

Figure 9: Below Grade Floc Tanks and Sedimentation Basins

Figure 10: Below Grade Floc Tanks and Sedimentation Basins

Figure 11: Below Grade Floc Tanks and Sedimentation Basins



ASSET MANAGEMENT INSPECTION REPORT

Filter Beds – Peterborough Water Treatment Plant

1230 Water Street North,

Peterborough ON

Peterborough Utilities Commission

August 2022

Inspector: J. Sayles

UTILITIES PETERBOROUGH COMMISSION

WATER
RIVERVIEW PARK AND ZOO

Asset Management Inspection Results – 2022

BUILDING: Filter Beds, WTP

ADDRESS: 1230 Water St N.

BUILT: 1922 and 1967

SERVICE: Water Treatment Plant

LATITUDE: 44.340268° (1922)
44.339825° (1967)

LONGITUDE: 78.311532° (1922)
78.312188° (1967)

FILTERS: Plant #1 - Nine (9) Small filters with a combined capacity of 50,000m^3/day
Six (6) dual media (anthracite) gravity filter
Three (3) granulated activated carbon (GAC) gravity filter

Plant #2 - Two (2) Large filters with a combined capacity of 51,000m^3/day
Two (2) dual media gravity filter

CONTROLS: SCADA

OVERALL CONDITION: FAIR

BUILDING AND PROCESS STRUCTURAL – FAIR CONDITION

The filter beds are divided into two distinct areas of the treatment plant based on the year of install. The nine (9) small filter beds are located in the north gallery of the original building constructed in 1922 and is commonly refer to as Plant #1. These filter beds are downstream of the below grade flocculation tanks and sediment basins located directly west of the filter beds. The two (2) large filter beds are located in the south addition constructed in 1967 and are commonly referred to as Plant #2. They are fed from the flocculation tanks and sedimentation basins 5 and 6 located north and east of the filter beds. At the time of inspection these components were observed to be in fair condition.

BUILDING ARCHITECTURAL – FAIR CONDITION

The Filter Bed Area in Plant #1 is very dated, with little upgrades to the filter bed area since its construction. At the time of inspection, the paint on the ceiling was peeling. It is recommended that the ceiling be repaired. The Filter Bed area in Plant #1 is in fair condition. The Filter Bed area in Plant #2 is in good condition and no deficiencies were observed at the time of the inspection.

BUILDING SERVICES – FAIR CONDITION

No deficiencies in power supply, lighting, or heating were observed in the filter bed areas. Lighting is provided by overhead fluorescent lights. Heating is provided by electric heaters. Generally the building services are in fair condition.

PROCESS MECHANICAL AND MEDIA – FAIR CONDITION

The filter beds are back washed on a regular basis to ensure the media continues to perform as designed. The dual media gravity filters are a long life-cycle system. The GAC gravity filter media is removed and replaced routinely at the end of its life-cycle and is in fair to good condition. Most of the mechanical items were not able to be physically inspected, and are assumed to be in fair condition.

PHOTOS

Figure 1: Filter Control Gallery looking North

Figure 2: Filter Bed #1 and Controls

Figure 3: Filter Bed #2 and Controls

Figure 4: Filter Bed #3 and Controls

Figure 5: Filter Bed #4 and Controls

Figure 6: Filter Bed #5 and Controls

Figure 7: Filter Bed #6 and Controls

Figure 8: Filter Bed #7 and Controls

Figure 9: Filter Bed #8 and Controls

Figure 10: Filter Bed #9 and Controls

Figure 11: Filter Beds #3, 4, 5 and 6, ceiling in need of repairs

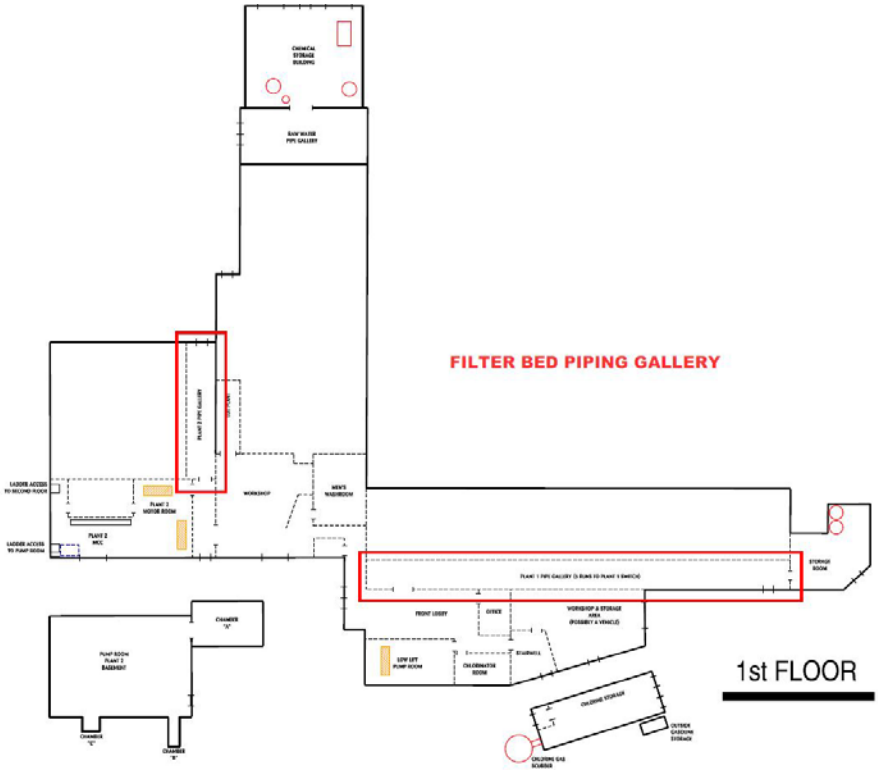
Figure 12: Filter Bed #7

Figure 13: Filter Bed#10

Figure 14: Filter Bed #10 Controls

Figure 15: Filter Bed #11

Figure 16: Filter Bed #11 Controls



ASSET MANAGEMENT INSPECTION REPORT

Filter Bed Piping Gallery – Peterborough Water Treatment Plant

1230 Water Street North, Peterborough ON

Peterborough Utilities Commission

August 2022

Inspector: J. Sayles

UTILITIES
PETERBOROUGH
COMMISSION

WATER
RIVERVIEW PARK AND ZOO

Asset Management Inspection Results – 2022

BUILDING: Filter Bed Piping Gallery, WTP

ADDRESS: 1230 Water St N.

BUILT: 1922 and 1967

SERVICE: Water Treatment Plant

LATITUDE: 44.340156° (1922)
44.339920° (1967)

LONGITUDE: 78.311526° (1922)
78.312130° (1967)

CONTROLS: SCADA

OVERALL CONDITION: FAIR

BUILDING AND PROCESS STRUCTURAL – FAIR CONDITION

The associated piping for each filter bed is located directly beneath the filter beds, on the 1st floor of the Water Treatment Plant. There are two pipe galleries, one for each Plant. The pipe gallery for Plant #1 was constructed in 1922 and underwent a rehabilitation in 2010. The pipe gallery for Plant #2 was constructed in 1967. No concerns were identified within each pipe gallery and generally is in fair condition.

BUILDING SERVICES – FAIR CONDITION

No deficiencies in power supply, lighting, or heating were observed in either pipe gallery. The lighting is provided by overhead fluorescent lighting. Heating is by hot water radiate heat in the Plant #1 pipe gallery and by overhead electric heaters in the Plant #2 pipe gallery. At the time of inspection, all services related to the building appeared to be in fair condition.

PROCESS PIPING – FAIR CONDITION

The piping for Plant #1 was retrofitted to stainless steel in 2000. The piping for Plant #2 is the original ductile iron and is in fair condition. All pipes and bends are generally in good condition. The piping is functioning as designed. No deficiencies were observed at the time of the inspection.

PROCESS MECHANICAL – GOOD CONDITION

All valves are fully automated, and SCADA controlled, and are in good condition. Turbidity monitors on each filter bed are in excellent condition.

PHOTOS

Figure 1: Plant #1 Pipe Gallery looking North

Figure 2: Plant #1 Pipe Gallery looking South

Figure 3: Filter Bed #1 Piping

Figure 4: Filter Bed #2 Piping

Figure 5: Filter Bed #3 Piping

Figure 6: Filter Bed #4 Piping

Figure 7: Filter Bed #5 Piping

Figure 8: Filter Bed #6 Piping

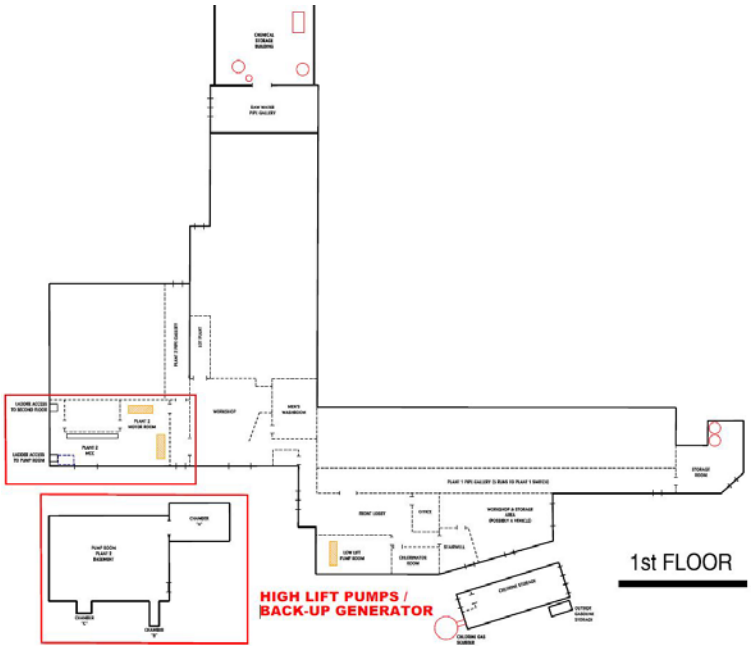
Figure 9: Filter Bed #7 Piping

Figure 10: Filter Bed #9 Piping

Figure 11: Plant #2 Pipe Gallery looking West

Figure 12: Filter Bed #10 Piping

Figure 13: Filter Bed #11 Piping



ASSET MANAGEMENT INSPECTION REPORT

High Lift Pumps / Back-up Generator – Peterborough Water Treatment Plant

1230 Water Street North, Peterborough ON

Peterborough Utilities Commission

August 2022

Inspector: J. Sayles

UTILITIES
PETERBOROUGH
COMMISSION

WATER
RIVERVIEW PARK AND ZOO

Peterborough Utilities Commission

1867 Ashburnham Drive, Peterborough, Ontario

Partners in Peterborough Green-Up

Asset Management Inspection Results – 2022

BUILDING: High Lift Pumps / Back-up Generator, WTP **ADDRESS**: 1230 Water St N.

BUILT: 1922 **SERVICE**: Water Treatment Plant

LATITUDE: 44.339762° **LONGITUDE:** 78.312026°

PUMPS: Zone 2 Distribution Pump #1 (Diesel) – 157.4 L/s at 79m TDH
Zone 2 Distribution Pump #2 – 262.7 L/s at 79m TDH
Zone 2 Distribution Pump #3 – 210.6 L/s at 79m TDH

Backwash Pump #1
Backwash Pump #2

GENERATOR: Russel-Hipwell Gen Set w/ Cummins Motor

CONTROLS: SCADA

OVERALL CONDITION: FAIR

BUILDING AND PROCESS STRUCTURAL – FAIR CONDITION

The high lift pumps and associated piping is located in the south east portion of the water treatment plant on the lower level. The motors are located on the main floor. Vertical shafts connect the motors to the pumps. The high lift pumps were installed in 1922. At the time of the construction of Plant #2, this area was retrofitted to include the piping required to supply Plant #2 with backwash water. No structural changes have been made to the high lift area and it appears to be in fair to good condition.

BUILDING ARCHITECTURAL – FAIR CONDITION

The high lift pumps are housed in the original 1922 building's basement. The motors and generator are located above the pumps. There is a large east facing window providing daytime lighting. There is an overhead door for maintenance access purposes. All items appear to be in fair condition.

BUILDING SERVICES – GOOD CONDITION

No deficiencies in power supply, lighting, or heating were observed in this area. Lighting is provided by overhead fluorescent lights. Heating is provided by overhead electric heaters. The exhausts for the diesel pump and generator are vented to the exterior. The fuel tank is located outside of the building. At the time of inspection, all services related to the building appeared to be in good condition.

PROCESS PIPING – FAIR CONDITION

The piping is generally cast iron and in fair condition. Where replacement piping has been installed, stainless steel pipe was chosen. All pipes and bends are in good condition. The high lift pumps are functioning satisfactorily, and it is not recommended that the pipes be replaced. No deficiencies were observed at the time of the inspection.

PROCESS MECHANICAL – GOOD CONDITION

All gate valves, butterfly valves and check valves appear to be in good condition. The generator is capable of running the lighting and instrumentation for the water treatment plant.

SCADA – GOOD CONDITION

All SCADA components are in good condition and do not need to be replaced.

PHOTOS

Figure 1: High Lift Pumps at Water Treatment Plant

Figure 2: Chamber 'A' Backwash Piping

Figure 3: High Lift Pump Pipe Gallery

Figure 4: High Lift Pumps – Valves and Piping

Figure 5: High Lift Pumps Piping

Figure 6: High Lift Pumps Check Valves

Figure 7: High Lift Pumps #1, #2 and #3

Figure 8: Pump #1 Diesel Motor

Figure 9: High Lift Electric Motor #2

Figure 10: High Lift Electric Motor #3

Figure 11: Backwash Electric Motor #1

Figure 12: Backwash Electric Motor #2

Figure 13: Electrical Panel and MCC

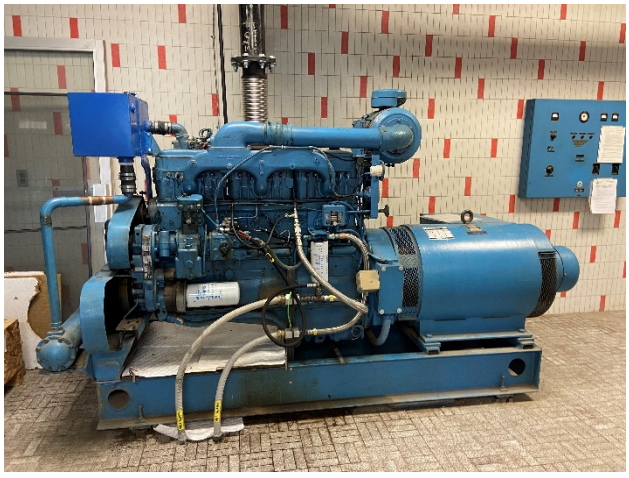
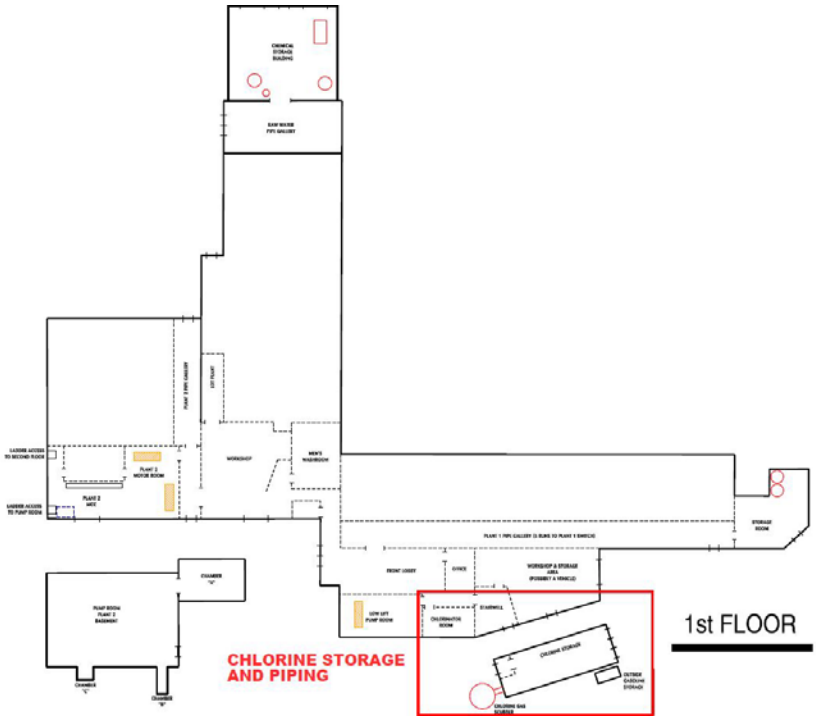


Figure 14: Back-up Generator



ASSET MANAGEMENT INSPECTION REPORT

Chlorine Gas Storage and Injector Room – Peterborough Water Treatment Plant

1230 Water Street North, Peterborough ON

Peterborough Utilities Commission

August 2022

Inspector: J. Sayles

UTILITIES
PETERBOROUGH
COMMISSION

WATER
RIVERVIEW PARK AND ZOO

Peterborough Utilities Commission

1867 Ashburnham Drive, Peterborough, Ontario

Partners in Peterborough Green-Up

Asset Management Inspection Results – 2022

BUILDING: Chlorine Storage and Injector Room, WTP

ADDRESS: 1230 Water St N.

BUILT: 1967

SERVICE: Water Treatment Plant

LATITUDE: 44.340119°

LONGITUDE: 78.311345°

CONTROLS: SCADA

OVERALL CONDITION: GOOD

BUILDING AND PROCESS STRUCTURAL – GOOD CONDITION

The Chlorine Storage Building is adjacent to the water treatment plant. It is a brick, one storey building on the East side of the main building. The Chlorine Storage Building can house up to 18 - 1 ton chlorine gas cylinders. Immediately to the south, is the chlorine gas scrubber. No concerns were identified with the chlorine storage building or the chlorine injector room, and is in good condition.

BUILDING ARCHITECTURAL – GOOD CONDITION

There are three doors for access to the chlorine storage building. An employee entrance is on the south side of the building. Immediately inside this door is the foyer with the explosion proof light switches and air quality gauges for the building. An overhead door for delivery and maintenance of the building is on the north side of the building. The building is equipped with an overhead hoist for delivery and movement of the chlorine cylinders. An employee entrance is also on the north side. At the time of the inspection, no issues were noted and the general condition is good. The chlorine injector room is located inside the water treatment plant on the east side of the building in proximity of the chlorine storage building.

BUILDING SERVICES – GOOD CONDITION

The chlorine storage building is accessible through an access key card and smart key doorknob set. Access is strictly for PUG employees of the water treatment plant. Lighting is provided by wall mounted fluorescent lights. Heating is provided by ceiling hung electric heaters. No deficiencies in power supply, lighting, or heating were observed in the building. At the time of inspection, all services related to the building appeared to be in good condition.

SITE WORKS – GOOD CONDITION

The asphalt area around the chlorine storage building is in good condition. The building is in a low vehicular traffic area and is not accessible by the Riverview Park and Zoo visitors.

PROCESS PIPING – GOOD CONDITION

The chlorine piping is in good condition between the chlorine storage building and the injector room in the treatment plant. No deficiencies were observed at the time of the inspection. The piping between the injector room and the intake zebra-mussel control is functioning as intended. The piping between the injector room and the pre-contact tank and the post treatment is functioning as intended with no known deficiencies at the time of the inspection. The process piping appears to generally be in good condition as a whole.

PROCESS MECHANICAL – GOOD CONDITION

There are four (4) chlorinators located in the chlorine injector room. The chlorinators are for disinfection, back-up, post feed and zebra-mussel control. The associated valves and injectors are in good condition.

SCADA – GOOD CONDITION

All SCADA components are in good condition and do not need to be replaced.

PHOTOS

Figure 1: Chlorine Storage Building

Figure 2: 18 – 1 ton Chlorine Gas Cylinders

Figure 3: Chlorine Scrubber

Figure 4: Chlorinator

Figure 5: Chlorine Zebra-Mussel Control, Pre and Post Injectors

ASSET MANAGEMENT INSPECTION REPORT

Chlorine Contact Tanks and Clear Wells – Peterborough Water Treatment Plant

1230 Water Street North, Peterborough ON

Peterborough Utilities Commission

August 2022

Inspector: J. Sayles

UTILITIES
PETERBOROUGH
COMMISSION

WATER
RIVERVIEW PARK AND ZOO

Peterborough Utilities Commission

1867 Ashburnham Drive, Peterborough, Ontario

Partners in Peterborough Green-Up

Asset Management Inspection Results – 2022

BUILDING: Chlorine Contact Tanks and Clear Wells, WTP **ADDRESS**: 1230 Water St N.

BUILT: 1922, 1967, 2017 **SERVICE**: Water Treatment Plant

LATITUDE: 44.339297° **LONGITUDE:** 78.312598°

CAPACITY: Clearwell #2 – from Filters 1-9, 600m^3
Clearwell #3 – from the Chlorine Contact Tank, 6,100m^3
Clearwell #4 – from Clearwell #3, 900m^3
Total Chlorine Contact Tank – 5,000m^3

CONTROLS: SCADA

OVERALL CONDITION: GOOD

BUILDING AND PROCESS STRUCTURAL – GOOD CONDITION

Clearwell (CW) #2 is located beneath the southeast corner of the Water Treatment Plant, directly beneath Plant #2 and was constructed in 1967. Chlorine Contact Tank (CCT) #1 and CW #3 was constructed in 1922, with upgrades completed in 1997. CW #4 and CCT #2 was constructed in 2017. CW#3 is scheduled for a complete drain and inspection in 2023. No concerns were identified on the surface surrounding the clearwells and chlorine contact tank, and all building and process structural items are in overall good condition.

BUILDING SERVICES – GOOD CONDITION

No deficiencies in power supply, lighting, or heating were observed in each structure. At the time of inspection, all services related to the facility appeared to be in good condition.

SITE WORKS – GOOD CONDITION

The sodded area above CCT #1, CCT #2, CW #3 and CW #4 appears to drain surface water well. The area is accessible by the Riverview Park and Zoo visitors. The weir wall electric motors and controls are protected by a black vinyl chain-link fence complete with a padlock for entry. The area around the station is sodded with regular lawn cutting being completed by RPZ staff. Site works are in good condition.

PROCESS PIPING – UNKNOWN CONDITION

All process piping is below grade for the chlorine contact tanks and clearwells. No deficiencies were noted or observed, however most of the piping was not available for a physical inspection.

PROCESS MECHANICAL – GOOD CONDITION

The weir wall electric motors and controls appear to be in good condition. Regular maintenance is completed on all mechanical components of the system.

SCADA – GOOD CONDITION

All SCADA components are in good condition and do not need to be replaced.

PHOTOS

Figure 1: Chlorine Contact Tank #1 Above Grade looking South, Contact Tank #2 and Clear Well #4 in background

Figure 2: Clear Well # 4 and Weir Wall Controls Above Grade

Figure 3: Looking North at Chlorine Contact Tank #1 (right) and Clear Well #3 (left)

Figure 4: Access Hatch to Chlorine Contact Tank #1

Figure 5: West bank of Clear Well #3, looking South

ASSET MANAGEMENT INSPECTION REPORT

Peterborough Water Treatment Plant
Overall Building and Office Space

1230 Water Street North, Peterborough ON

Peterborough Utilities Commission

August 2022

Inspector: J. Sayles

UTILITIES
PETERBOROUGH
COMMISSION

WATER
RIVERVIEW PARK AND ZOO

Peterborough Utilities Commission

1867 Ashburnham Drive, Peterborough, Ontario

Partners in Peterborough Green-Up

Asset Management Inspection Results – 2022

BUILDING: Peterborough Water Treatment Plant **ADDRESS**: 1230 Water St N.

BUILT: 1922, Additions in 1952, 1967, 1997, 2000, 2003 and 2017

LATITUDE: 44.339905° **LONGITUDE:** 78.311691°

OVERALL CONDITION: FAIR

SITE WORKS – GOOD CONDITION

The Peterborough Water Treatment Plant is located at 1230 Water Street North in the City of Peterborough. The treatment plant shares its property with the Riverview Park and Zoo (RPZ). The RPZ is owned and operated by Peterborough Utilities Group. The driveway access to the treatment plant is also the main pedestrian corridor for the RPZ and one of its main attractions, the Miniature Train Ride. The site's lawns and flowerbeds are maintained by RPZ staff and kept in good condition. The RPZ visitors are able to access the outside of the treatment plant, however, all entrances are controlled by access key card and smart key doorknob set.

BUILDING ARCHITECTURAL (EXTERIOR) – FAIR CONDITION

The Water Treatment Plant receives its water from the Otonabee River to the east. The original building was constructed in 1922 and has undergone several additions and upgrades since. The complex is comprised of three (3) buildings, several below grade valve chambers, clearwells, chlorine contact tanks, flocculation tank, sedimentation basins and associated piping. The exterior of the building is kept clean and maintained by maintenance and RPZ staff. The brick veneer is in fair condition with no deficiencies noted at the time of the inspection. The non-structural components of the roof of the 1967 and 1997 expansions were replaced in 2016.

OFFICE SPACE AND BUILDING SERVICES – FAIR CONDITION

All Water Treatment process areas are only accessible by Water Treatment Plant staff through a key card or smart key doorknob set. The office area and common staff areas are accessible to all staff and visitors. At the time of the inspection, no deficiencies were identified with the office space, common areas or meeting rooms and are generally in fair condition.

The lighting throughout is provided by overhead fluorescent light fixtures. Heating and cooling are provided by a centralized HVAC system. At the time of inspection, all services related to the building appeared to be in fair condition.

PHOTOS

Figure 1: Main Entrance

Figure 2: Main Entrance, Employee Parking

Figure 3: Main Foyer

Figure 4: Second Floor, Filter Bed 6 (background)

Figure 5: Second Floor, Laboratory (background)

Figure 6: Laboratory

Figure 7: Original Control Room, Currently Staff Lounge

Figure 8: Board Room, Training Room

Figure 9: Office Corridor

Figure 10: Staff Offices

Figure 11: Pilot Plant Office Corridor

Figure 12: Machine Shop

ASSET MANAGEMENT INSPECTION REPORT

Pilot Plant – Peterborough Water Treatment Plant

1230 Water Street North, Peterborough ON

Peterborough Utilities Commission

September 2022

Inspectors: J. Sayles & J. Armour

UTILITIES
PETERBOROUGH
COMMISSION

WATER
RIVERVIEW PARK AND ZOO

Asset Management Inspection Results – 2022

BUILDING: Pilot Plant, WTP

ADDRESS: 1230 Water St N.

BUILT: 2010

SERVICE: Water Treatment Plant

LATITUDE: 44.340302°

LONGITUDE: 78.312755°

OVERALL CONDITION: GOOD

OVERVIEW

The Pilot Plant was constructed and incorporated into the Water Treatment Plant in 2010. The Peterborough Water Treatment Plant has conducted pilot-scale studies in an effort to improve water quality, optimize production, and investigate next-generation treatment technologies for the citizens of Peterborough.

A 5000:1 scale-model version of the main treatment facility, the pilot plant includes processes such as coagulation, tapered mixing, flocculation, settling and filtration. In addition to conventional water treatment studies, ozone and advanced oxidation equipment were incorporated into the pilot plant design in 2015.

The conventional pilot plant structure is currently in excellent condition. No concerns were identified with the structure or electrical components of the pilot plant.

BUILDING PROCESS – GOOD CONDITION

The pilot plant is a multi-level process with the raw water header, flocculation, and sedimentation basins installed on the second level of the WTP. The main floor area of the pilot plant has gravity fed dual-media filter columns that replicate the depth and head-pressure associated with the full-scale filter design. The main floor of the pilot plant also contains on-line analytical equipment, control panel, and the contact tank and clearwell. The basement level has gravity-fed automated solenoid systems to sequence full and pilot-scale water to advanced on-line analytical equipment, including total organic carbon analyzers, UV_{254}, particle counters, and DO/ORP. The basement level also contains lead/copper pipe loops and pumps associated with corrosion control program.

The Ozone pilot plant is on loan through the University of Toronto's Drinking Water Research Group. The ozone pilot plant is located in the Chemical Building of the water treatment plant. The ozone is segregated in a special area designed to meet all safety parameters associated with production and dissolution of ozone gas in the water supply.

BUILDING SERVICES - VERY GOOD CONDITION

The pilot plant area is located within the water treatment plant and is fully serviced with all amenities. There are no deficiencies in power supply, lighting, communications, heating, ventilation, or electrical. Access to the pilot plant is thru an access key card and smart key doorknob set. Access is strictly for PUG

employees of the water treatment plant. At the time of the inspection, all services related to the building appeared to be in excellent condition.

PROCESS PIPING – GOOD CONDITION

No deficiencies were noted with the process piping at the time of the inspection. Regular maintenance is completed on the facility and given the age of the facility no deficiencies were expected.

PROCESS MECHANICAL – GOOD CONDITION

No deficiencies were noted with the pumps, valves or controls at the time of the inspection. Regular maintenance is completed on the facility.

PROCESS ANALYTICAL – GOOD CONDITION

Analytical equipment is regularly maintained and replaced as required. Deficiencies in analytical equipment not currently in use is due to calibration and required replacement components. Not all on-line analytical equipment is required to complete each objective of pilot plant testing.

PHOTOS

Figure 1: Upper Floor of Pilot Plant – Conventional Treatment Train

Figure 2: Pilot Plant Dual-Media Filters

Figure 3: Lower Floor of Pilot Plant – Analytical Equipment

Figure 4: Main Floor of Pilot Plant

Figure 5: Ozone Pilot Plant

Figure 6: Lower Floor of Pilot Plant – Analytical Equipment

ASSET MANAGEMENT INSPECTION REPORT

Process Waste Building – Peterborough Water Treatment Plant

1230 Water Street North, Peterborough ON

Peterborough Utilities Commission

August 2022

Inspector: J. Sayles

UTILITIES
PETERBOROUGH
COMMISSION

WATER
RIVERVIEW PARK AND ZOO

Peterborough Utilities Commission

1867 Ashburnham Drive, Peterborough, Ontario

Partners in Peterborough Green-Up

Asset Management Inspection Results – 2022

BUILDING: Process Waste Building, WTP

ADDRESS: 1230 Water St N.

BUILT: 2003

SERVICE: Water Treatment Plant

LATITUDE: 44.340302°

LONGITUDE: 78.312755°

OVERALL CONDITION: VERY GOOD

BUILDING AND PROCESS STRUCTURAL – VERY GOOD CONDITION

The Process Waste Building was constructed in 2003 to satisfy the City of Peterborough Waste Water Treatment Plant's requirement for solid waste in the sanitary system. No structural changes have been made to the facility and it appears to be in excellent condition. No concerns were identified in the building or immediately outside of the building.

BUILDING ARCHITECTURAL – GOOD CONDITION

The building is a multi level process plant with the large Sludge Tank and the Decant tanks below grade accepting the filter bed's backwash water and sludge from the sedimentation tank from the treatment plant. The Thickening tanks are elevated on the second floor. The Centrifuge is also on the second floor and the loading of the dewatered cake is by gravity to a truck below for transport to the landfill. The second floor has a control room and office space along with a two-piece washroom. Public washrooms for the Riverview Park and Zoo guests are accessible from the east side of the building. All architectural components were observed to be in good condition.

BUILDING SERVICES – GOOD CONDITION

The building is fully serviced with all amenities. During the Covid-19 pandemic, the building was used as overflow office spaces to maintain social distancing at work. No deficiencies in power supply, lighting, or heating were observed in the building. Access to the building is thru an access key card and smart key doorknob set. Access is strictly for PUG employees of the water treatment plant. At the time of the inspection, all services related to the building appeared to be in good condition.

SITE WORKS – VERY GOOD CONDITION

The Process Waste Building shares the property with the Water Treatment Plant and the Riverview Park and Zoo. Outside of the building is kept clean and maintained by RPZ staff. RPZ guests are able to access the public washrooms on the east side of the building. The site works are in excellent condition.

PROCESS PIPING – VERY GOOD CONDITION

No deficiencies were noted with the process piping at the time of the inspection. Regular maintenance is completed on the facility and given the age of the facility no deficiencies were expected. The process piping is in excellent condition.

PROCESS MECHANICAL – VERY GOOD CONDITION

No deficiencies were noted with the pumps, valves or controls at the time of the inspection. Regular maintenance is completed on the facility. The process mechanical components are in excellent condition.

PHOTOS

Figure 1: Decant Tanks

Figure 2: Decant Tanks

Figure 3: Sludge Tank

Figure 4: Sludge Tank Controls

Figure 5: Decant Tank Inlet Piping

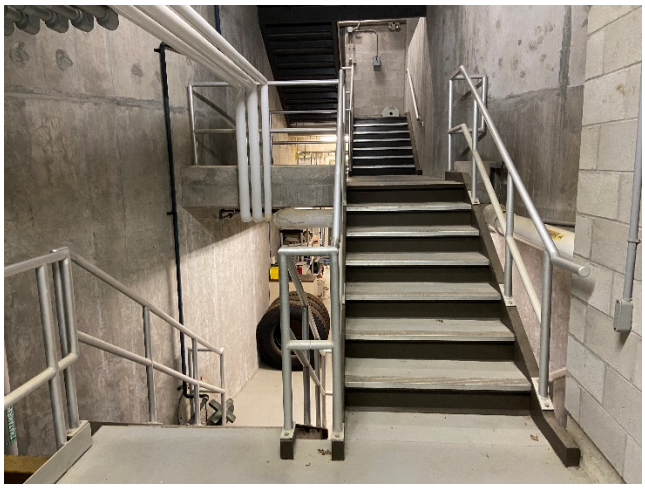


Figure 6: Stairwell between the Ground Floor, Decant/Sludge Tanks and Thickening Tanks

Figure 7: Thickening Tank #1

Figure 8: Thickening Tank #1 Controls

Figure 9: Thickening Tank #2

Figure 10: Thickening Tank #2 Controls

Figure 11: Electrical Switch Gear

Figure 12: Centrifuge

Figure 13: Centrifuge MCC

Figure 14: Thickened Sludge Pumps

Figure 15: Dechlorination Station

Figure 16: Dewatered Cake Loading Bay

ASSET MANAGEMENT INSPECTION REPORT

Generator House – Peterborough Water Treatment Plant

1230 Water Street North, Peterborough ON

Peterborough Utilities Commission

August 2022

Inspector: J. Sayles

UTILITIES
PETERBOROUGH
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WATER
RIVERVIEW PARK AND ZOO

Peterborough Utilities Commission

1867 Ashburnham Drive, Peterborough, Ontario

Partners in Peterborough Green-Up

Asset Management Inspection Results – 2022

BUILDING: Generator House, Water Treatment Plant

ADDRESS: 1230 Water St N.

BUILT: 2000

SERVICE: Water Treatment Plant

LATITUDE: 44.339573°

LONGITUDE: 78.312187°

ENGINE: Caterpillar G3516B, Natural Gas

GENERATOR: Caterpillar G3516B Gen Set (max 1040kW)

CONTROLS: SCADA

OVERALL CONDITION: VERY GOOD

BUILDING AND PROCESS STRUCTURAL – VERY GOOD CONDITION

The Generator House located at the Peterborough Water Treatment Facility was constructed in 2000. The building houses a CAT G3516B, Natural Gas Fuel Generator Set. The generator operates at 990kW and is designed to provide emergency power to the Water Treatment Plant. The Generator House is located south of the main building and on the north side of the treatment plant's chlorine contact tank and clear wells. All building and process structural items were noted to be in excellent condition.

BUILDING ARCHITECTURAL – VERY GOOD CONDITION

The building is a single storey facility comprising of two rooms. The front, main entrance is immediately off of the driveway/parking lot to the Water Treatment Plant. This room houses the switch gear, SCADA and controls for the generator. The generator room houses the generator and diesel engine, along with the associated cooling system and exhaust. The manual generator controls are also located in this room. A lower level includes the electrical chase and is accessible through an access hatch in the control room. All building architectural items were noted to be in excellent condition.

BUILDING SERVICES – GOOD CONDITION

No deficiencies in power supply, lighting, or heating were observed in the building. A fire extinguisher is located immediately inside of the main entrance door. Access to the building is through an access key card and smart key doorknob set. At the time of inspection, all services related to the building appeared to be in good condition.

SITE WORKS – VERY GOOD CONDITION

The Generator House shares the property with the Water Treatment Plant and the Riverview Park and Zoo. Outside of the building is kept clean and maintained by RPZ staff. RPZ guests are able to access the areas outside of the building. Site works are in excellent condition.

ELECTRICAL – GOOD CONDITION

No deficiencies were noted with the electrical at the time of the inspection, and all items were observed to be in good condition. Regular maintenance is completed on the facility and given the age of the facility no deficiencies were expected.

MECHANICAL – VERY GOOD CONDITION

No deficiencies were noted at the time of the inspection, all mechanical items are in excellent condition. Regular maintenance is completed on the facility.

PHOTOS

Figure 1: MCC

Figure 2: Switch Gear and SCADA

Figure 3: Motor with Gen Set

Figure 4: Caterpillar Motor

Figure 5: Cooling Piping

Figure 6: Generator Controls

Figure 7: Generator Label

ASSET MANAGEMENT INSPECTION REPORT

Chemong Road Booster Pumping Station

1110 Chemong Rd, Peterborough ON

Peterborough Utilities Commission

August 2022

Inspectors: J. Sayles & A. Park

UTILITIES
PETERBOROUGH
COMMISSION

WATER
RIVERVIEW PARK AND ZOO

Peterborough Utilities Commission

1867 Ashburnham Drive, Peterborough, Ontario

Partners in Peterborough Green-Up

Asset Management Inspection Results – 2022

STATION: Chemong Booster Pumping Station

ADDRESS: 1110 Chemong Rd

BUILT: 1981

SERVICE: Zone 2 to Zone 3N

LATITUDE: 44.327010 degrees

LONGITUDE: 78.338880 degrees

PUMP 1: Pleuger L-120-1, 78.9 L/s @ 36.6 m head

PUMP 2: Armstrong-HP0504FKB, 61.3 L/s @ 36.6 m head

PUMP 3: Flowserve-Pleuger 113-450, 37.9 L/s @ 36.6 m head

CONTROLS: SCADA

ELEVATION: 251.8 m

OVERALL CONDITION: GOOD

BUILDING AND PROCESS STRUCTURAL – FAIR CONDITION

The Chemong Booster Pumping Station is one (1) of five (5) below grade pumping stations in the City of Peterborough. Since its construction in 1981, no changes have been made to the facility or infrastructure other than routine maintenance. The equipment in the station is below grade except for the electrical and SCADA equipment and appears to be in fair condition. No concerns were identified on the surface surrounding the station or below grade, in the station.

BUILDING ARCHITECTURAL – GOOD CONDITION

Above grade there are two (2) concrete slabs each with an access to the below grade station. The main access hatch is accessible using fall-arrest equipment for entry into the station. The second access is through a concrete lid for maintenance purposes. There are two (2) above grade cabinets for electrical and SCADA equipment. The cabinets are in good condition with some visible rust on the inside. There are hedges on the north and west sides of the station acting as a visual barrier between the station and the intersection. A wooden border/retaining wall separates the station from the adjacent driveway on the east and south sides. Between the hatches and cabinets, there is a stone pathway which is partially overgrown. Below grade, the internal pipes and pumps are in a concrete chamber, with no architectural features. The concrete chamber is in good condition. Some of the piping, bends, pumps and valves have some discolouration due to age.

BUILDING SERVICES - GOOD CONDITION

No deficiencies in power supply, lighting, or heating were observed in the station. There is an exhaust fan complete with duct work for ventilation. The hatch is locked with a padlock, and there is no fire extinguisher in the station. At the time of inspection, all services related to the building appeared to be in good repair.

SITE WORKS – GOOD CONDITION

The Chemong Booster Pumping Station is located on the southeast corner at the intersection of Towerhill Road and Chemong Road. The station does not have its own driveway, but a small parking lot in front of the station at the Kawartha-Haliburton Children's Foundation is available for use. There are no fences surrounding the station as it is in a commercial area. The area around the station is sodded with regular lawn cutting being completed by a third-party vendor.

PROCESS PIPING – FAIR CONDITION

All the flanged pipes in the station are ductile iron. Where a pump or valve has been replaced, stainless steel spool pieces have been fabricated. All piping and fittings are in fair condition. The station is functioning satisfactorily. No deficiencies were observed at the time of the inspection.

PROCESS MECHANICAL – GOOD CONDITION

There is no generator in the station, and all gate valves, butterfly valves, check valves and air release valves are in good condition. Pump one (1) was replaced in 1991 and pump two (2) was replaced in 2009.

SCADA – GOOD CONDITION

The SCADA monitoring system includes the following:

One (1) Access Hatch Alarm
One (1) Inlet Pressure Monitor
One (1) Outlet Pressure Monitor
One (1) Motor Control Centre
One (1) Flood Water Alarm
One (1) Heat/Fire Alarm
One (1) Commercial Power Alarm
One (1) Low Building Temperature Alarm

All SCADA components are in good condition and do not need to be replaced.

PHOTOS

Figure 1: Gate valve in the southwest corner of the station

Figure 2: Electrical box

Figure 3: Label on pump 2

Figure 4: Pump 2

Figure 5: Pump 1

Figure 6: Pump 3, check valve and pressure reducing valve

Figure 7: Discharge pressure gauge on pump 2

Figure 8: Gate and Butterfly valve on pump 2

Figure 9: View of station facing the northwest corner

Figure 10: Swing check valve on pump 2

Figure 11: Label on switch check valve

Figure 12: Gate valve

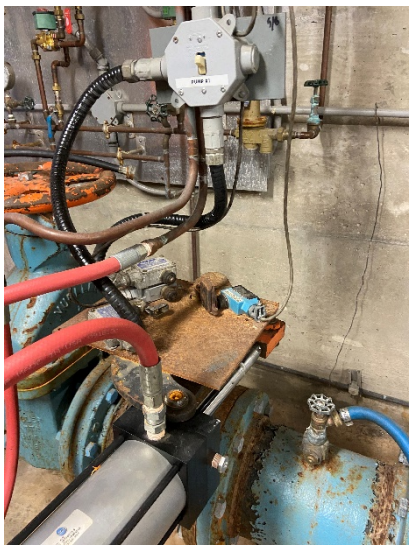

Figure 13: Butterfly valve on pump 1

Figure 14: Swing check valve on pump 3

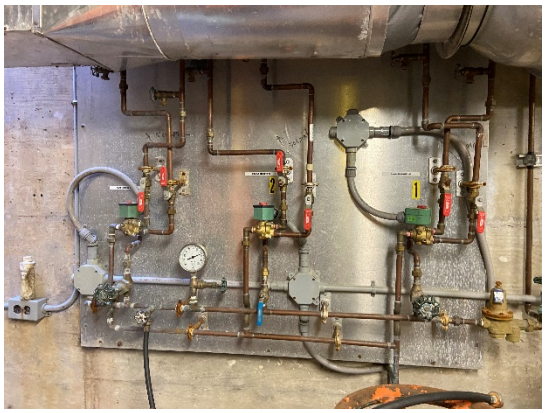

Figure 15: Automatic valve controls

Figure 16: Label on pressure reducing valve

Figure 17: Pressure reducing valve

Figure 18: Check valve

Figure 19: Label on check valve

Figure 20: Gate valves

Figure 21: Discharge pressure gauge (Zone 2)

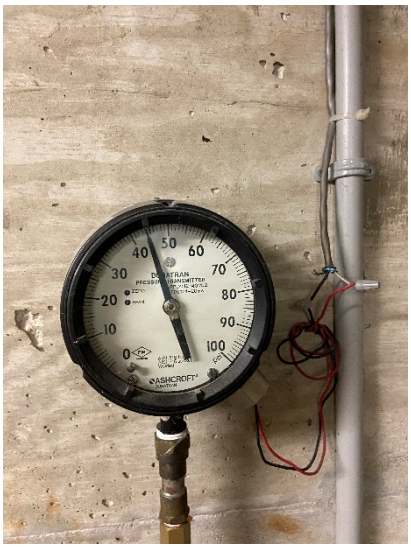

Figure 22: Suction pressure gauge (Zone 3N)

Figure 23: Sump pump

Figure 24: View of station facing northwest

Figure 25: Exhaust Fan

Figure 26: Gate valve on pump 3

Figure 27: Label on pump 3

Figure 28: Gate valve on by-pass

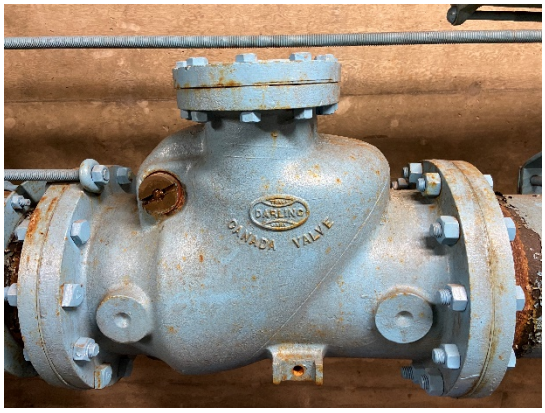

Figure 29: Gate valve on by-pass

Figure 30: Gate valve on pressure reducing valve

Figure 31: West electrical cabinet

Figure 32: North electrical cabinet

Asset Inventory List						
RMOH ID	**Equipment**	**Description**	**Year Installed**	**Manufacturer**	**Model Number**	**Serial Number**
BPS2	Pump 1	No Label - Inline Pump	1991			
	Pump 2	Armstrong-HP0504FKB 61.3 L/s @ 36.6m	2009	Armstrong	4000346-068	
	Pump 3	Flowserve-Pleuger 113-450 37.9 L/s @ 36.6 m - Inline Pump	1982	Pleuger	M6-460-2	1802MPS00958-1M
	Pressure Gauge	N/A		BII		
	Pressure Gauge	N/A		Ashcroft		
	Pressure Gauge	N/A		Ashcroft		
	Gate Valve	6"		Mueller		
	Gate Valve	6"		Mueller		
	Gate Valve	10"		Mueller		
	Gate Valve	10"		Mueller		
	Gate Valve	8"		Mueller		
	Gate Valve	8"		Mueller		
	Gate Valve	8"		Mueller		
	Gate Valve	8"		Mueller		
	Gate Valve	12"		Mueller		
	Gate Valve	10"		Jenkins		
	Butterfly Valve	8" Controlled with hydraulic cylinder				
	Butterfly Valve	8" Controlled with hydraulic cylinder				
	Butterfly Valve	8" Controlled with hydraulic cylinder				
	Check Valve	6" 250 PSI MAX		Valmatic	7206	
	Check Valve	8" 250 PSI MAX		Valmatic	7208	M364480
	Check Valve	8"		Valmatic		
	Check Valve	10"		Darling		
	Pressure Reducing Valve	6"			106-RPS	1081-97
	Exhaust Fan	N/A		Loren Cook CO.	12 CVD	138096-00

**Missing inventory data to be collected during next scheduled inspection*

ASSET MANAGEMENT INSPECTION REPORT

Clonsilla Booster Pumping Station

775 Sherbrooke St, Peterborough ON

Peterborough Utilities Commission

August 2022

Inspectors: J. Sayles & A. Park

UTILITIES
PETERBOROUGH
COMMISSION

WATER
RIVERVIEW PARK AND ZOO

Peterborough Utilities Commission

1867 Ashburnham Drive, Peterborough, Ontario

Partners in Peterborough Green-Up

Asset Management Inspection Results – 2022

STATION: Clonsilla Booster Pumping Station

ADDRESS: 775 Sherbrooke St

BUILT: 1963

SERVICE: Zone 1 to Zone 2

LATITUDE: 44.294830 degrees

LONGITUDE: 78.342650 degrees

PUMP 1: Ingersol-Dresser 10M41-1, 63.1 L/s @ 45.7 m head (peak pump)

PUMP 2: Flowserve-Pleuger-MS560-2, 94.6 L/s @ 45.7 m head (Installed in 2017, duty pump)

PUMP 3: Armstrong-Inline Vertical Pump, 94.6 L/s @ 45.7 m head (duty pump)

CONTROLS: SCADA

ELEVATION: 211 m

OVERALL CONDITION: FAIR

BUILDING AND PROCESS STRUCTURAL – FAIR CONDITION

The Clonsilla Booster Pumping Station is one (1) of five (5) below grade pumping stations in the City of Peterborough. The pump station was constructed in 1963, the pumps were replaced in 1999. No structural changes have been made to the station and it appears to be in fair condition. No concerns were identified on the surface surrounding the station or below ground in the station.

BUILDING ARCHITECTURAL – FAIR CONDITION

Above grade there are two (2) concrete slabs each with an access to the below grade station. The main access hatch is accessible using fall-arrest equipment for entry into the station. The second access is through a concrete lid for maintenance purposes. Along the north edge of the hatches is a gravel driveway from Kinsmen Way which can fit at least three (3) cars. Below grade, the internal pipes and pumps are in a concrete chamber, with no architectural features. There are water stains on the floor and the pipes have some discolouration due to age.

BUILDING SERVICES – FAIR CONDITION

No deficiencies in power supply, lighting, or heating were observed in the station. The duct work for the ventilation system was found to be in poor condition due to severe corrosion and section loss. There were some puddles of water below the pumps due to leaking, which could be improved with better drainage. The hatch is locked with a padlock, and there is no fire extinguisher in the station. At the time of inspection, all services related to the building appeared to be in fair condition.

SITE WORKS – GOOD CONDITION

The Clonsilla Booster Pumping Station is located on Kinsmen Way on the east side of the Clonsilla Reservoir, in front of the reservoir entrance. The area around the station is sodded with regular lawn cutting being completed by a third-party vendor.

PROCESS PIPING – FAIR CONDITION

All of the original flanged pipes in the station are ductile iron, thickness class 53 complete with cement mortar lining, all Victaulic grooved pipes are ductile iron thickness class 54 complete with cement mortar lining, and all flanged fittings are ductile iron cement lined. Where, replacement equipment was installed, stainless steel piping has been retrofitted to suit the application. All pipes and bends are in fair condition. The station is functioning satisfactorily, and it is not recommended that the pipes be replaced. At the time of the inspection, Pump #3 had been removed for repairs. No deficiencies were observed at the time of the inspection.

PROCESS MECHANICAL – GOOD CONDITION

There is no generator in the station, and all gate valves, butterfly valves, check valves and air release valves are in good condition.

SCADA – GOOD CONDITION

The SCADA monitoring system includes the following:

One (1) Access Hatch Alarm
One (1) Inlet Pressure Monitor
One (1) Outlet Pressure Monitor
One (1) Motor Control Centre
One (1) Flood Alarm

All SCADA components are in good condition and do not need to be replaced.

PHOTOS

Figure 1: Northwest corner of the station

Figure 2: Northeast corner of the station

Figure 3: Discharge end of pumps, feeding back to system

Figure 4: Exhaust Fan

Figure 5: Coupling

Figure 6: Another coupling

Figure 7: Water meter?

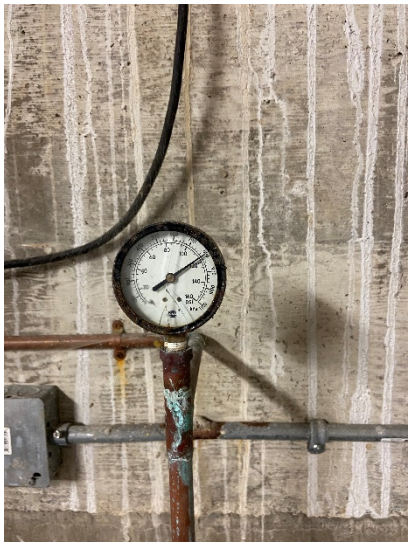

Figure 8: Discharge pressure gauge

Figure 9: Check valve and reducer

Figure 10: Check valve and inline pump

Figure 11: Label on check valve

Figure 12: Vertical pump 1

Figure 13: Label on pump 1

Figure 14: Suction pressure gauge

Figure 15: Butterfly valve on pump 1

Figure 16: Butterfly valve on pump 2

Figure 17: Pump 1 and 2

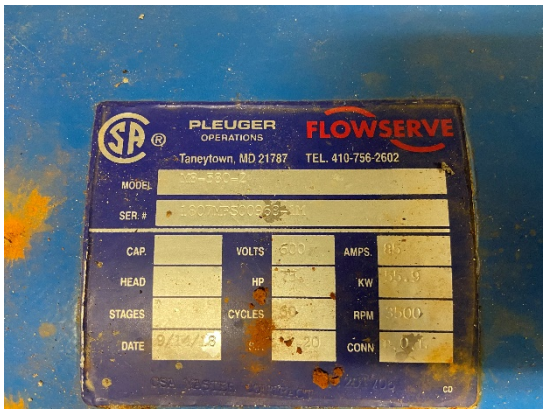

Figure 18: Label on pump 2

Figure 19: Reducer on pump 2

Figure 20: Reducer on pump 3

Asset Inventory List					
RMOH ID	**Equipement**	**Description**	**Manufacturer**	**Model Number**	**Serial Number**
BPS3	Pump 1	Ingersol-Dresser 10M41-1 63.1 L/s @ 45.7 m		P36G3428	X1111
	Pump 2	Flowserve-Pleuger-MS560-2 94.6 L/s @ 45.7 m		M8-380-2	1807MPS00968-1M
	Pump 3	Missing			
	Pressure Gauge	N/A	USG		
	Pressure Gauge	N/A	BII		
	Butterfly Valve	6" Controlled with hydraulic cylinder	Jenkins		
	Butterfly Valve	6" Controlled with hydraulic cylinder	Jenkins		
	Butterfly Valve	6" Controlled with hydraulic cylinder	Jenkins		
	Butterfly Valve	8" Controlled with hydraulic cylinder	Jenkins		
	Butterfly Valve	8" Controlled with hydraulic cylinder	Jenkins		
	Butterfly Valve	8" Controlled with hydraulic cylinder	Jenkins		
	Check Valve	6" 250 PSI MAX	Valmatic	7206	
	Check Valve	TBD			
	Check Valve	TBD			
	Flow Meter	TBD	Franklin Empire		
	Exhaust Fan	N/A	Loren Cook CO.	12CV17D	

**Missing inventory data to be collected in next scheduled inspection*

ASSET MANAGEMENT INSPECTION REPORT

Cumberland Booster Pumping Station

721 Cumberland Ave, Peterborough ON

Peterborough Utilities Commission

August 2022

Inspectors: J. Sayles & A. Park

UTILITIES
PETERBOROUGH
COMMISSION

WATER
RIVERVIEW PARK AND ZOO

Peterborough Utilities Commission

1867 Ashburnham Drive, Peterborough, Ontario

Partners in Peterborough Green-Up

Asset Management Inspection Results – 2022

STATION: Cumberland Booster Pumping Station

ADDRESS: 721 Cumberland Ave

BUILT: 2008

SERVICE: Zone 2 to Zone 3N

LATITUDE: 44.34199 degrees

LONGITUDE: 78.32238 degrees

PUMP 1+2: Duty Plad 310_REI, 50 L/s @ 37.5 m head

PUMP 3: Duty Plad 310_REI, 125 L/s @ 51 m head

CONTROLS: SCADA

ELEVATION: 251.80 m

OVERALL CONDITION: VERY GOOD

BUILDING AND PROCESS STRUCTURAL – VERY GOOD CONDITION

The Cumberland Booster Pumping Station is one of the newer stations in Peterborough as it was built in 2008, replacing an aging facility. Since its construction, no changes have been made to the building or infrastructure other than routine maintenance. All equipment in the station is above grade except for the 300mm inflow pipe. The building is in good condition and no major building and process structural concerns were identified.

BUILDING ARCHITECTURAL – VERY GOOD CONDITION

The station is one-story building made of concrete blocks, with a decorative finish on the exterior. It has a low peaking roof, finished with shingles and a communication antenna. The building borders a tree line to the west and the Parkway Trail to the south and to the east. To the north of the building, there is a parking lot adjacent to Cumberland Ave that can accommodate three (3) cars comfortably. The station has three (3) exhaust vents which are not blocked or covered by any obstacles. All walls, interior, exterior, and floors are clean and do not need cleaning, painting or replacement.

BUILDING SERVICES – GOOD CONDITION

Due to the age of the building, no deficiencies in power supply, lighting, heating, or drainage were expected or observed. The building is well ventilated with exhaust fans, complete with automatic louvers. Exterior lights are controlled by a photocell sensor and the main access door is secured with a smart key doorknob set. A fire extinguisher is accessible immediately inside of the access door. A wall mounted service sink with hot water is on site. At the time of inspection, all services related to the building appeared to be in good repair.

SITE WORKS – GOOD CONDITION

This site is located at the east/west midpoint of Cumberland Ave, at the north entrance of the Parkway Trail. There is no fence surrounding the property for security purposes as it is in a residential neighbourhood. The site generally drains away from the building to the north, east and south. A cutoff swale along the west side directs surface runoff away from the building. There are a few mature trees on

the site. The asphalt driveway and parking lot are in good condition. The remainder of the site is sodded with regular lawn cutting being completed by a third-party vendor.

PROCESS PIPING – VERY GOOD CONDITION

All the piping in the station is 304 stainless steel and is in very good condition as the station is only 15 years old. The station is functioning satisfactorily, and it is not recommended that the pipes be replaced. No deficiencies were observed at the time of the inspection.

PROCESS MECHANICAL – GOOD CONDITION

The station has a diesel generator and fuel tank, which is used to supply power to the pumps in the event of a power outage. The generator is inspected annually by a third-party vendor. The generator is in good condition and does not need to be replaced. All gate valves, butterfly valves, check valves and air release valves are in good condition.

SCADA – VERY GOOD CONDITION

The SCADA monitoring system includes the following:

One (1) Door Alarm
One (1) Inlet Pressure Monitor
One (1) Outlet Pressure Monitor
One (1) Motor Control Centre
One (1) Flow Monitor
One (1) Generator Battery Low Alarm
One (1) Generator Transfer Switch
One (1) Generator Fuel Tank Alarm
One (1) Flood Alarm
One (1) Low Building Temperature Alarm
One (1) Heat/Fire Alarm
One (1) AC Power Alarm

All SCADA components are in very good condition and do not need to be replaced.

PHOTOS

Figure 1: Cumberland BPS facing south

Figure 2: Cumberland BPS facing southwest

Figure 3: Pumps in the southeast corner of the station

Figure 4: Generator in the southeast station

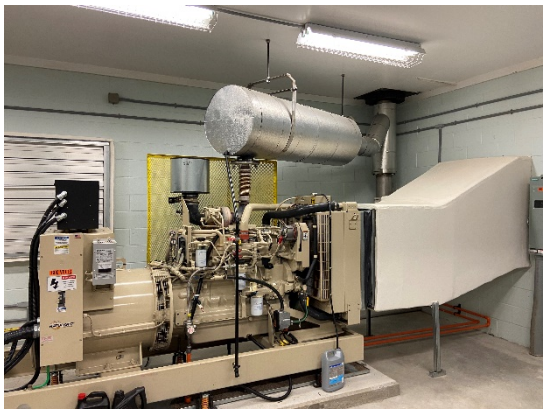

Figure 5: 180 kW Generator

Figure 6: SCADA and electrical equipment

Figure 7: Fuel tank in the northeast corner of the station

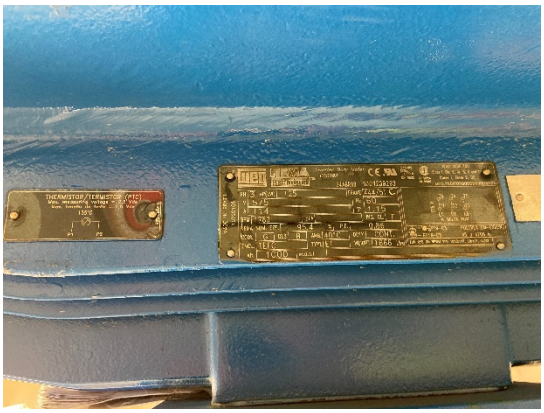

Figure 8: Label on pump 3

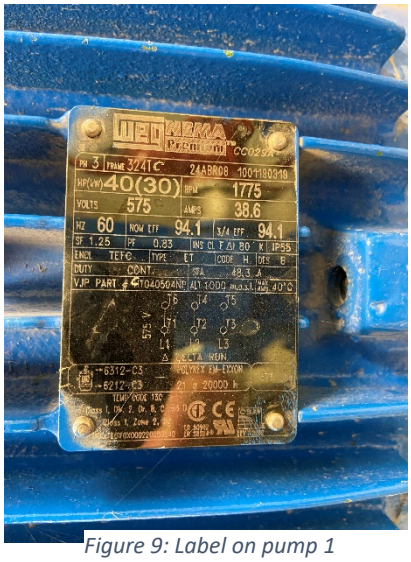

Figure 9: Label on pump 1

Figure 10: Label on pump 2

Figure 11: Electric water heater and service sink

Figure 12: Label on the AC generator

Figure 13: Flow meter

Figure 14: Label on the generator's engine

Figure 15: View of internal piping and pumps

Asset Inventory List								
RMOH ID	**Object Type**	**Equipment Category**	**Equipment**	**Description**	**Label**	**Manufacturer**	**Model Number**	**Serial Number**
BPS4			Duty Pump	Duty Plad 310_REI 50 L/s @ 37.5 m head	P1	Duty Plad	5x5x13 REI	08-87384-A
			Duty Pump	Duty Plad 310_REI 50 L/s @ 37.5 m head	P2	Duty Plad	5x5x13 REI	08-87384-B
			Fire Pump	Duty Plad 310_REI 125 L/s @ 51 m head	P3	Duty Plad	8x8x16 REI	0887384-C
			Fuel Tank	935 L		DTE Industries L	ULC-5602	D 61005
			Exhaust Fan	Complete with Louver		Belimo	AF24-5	
			Generator	180 kW 60 Hz 217 A		Katolight	CD180NJ6T3	301099-1-1-1108
			Air Release Valve	2" 300 PSI	AVR-1	Valmatic	202C2P1N1	
			Air Release Valve	2" 150 PSI	AR-1	Valmatic	38.2	
			Pressure Gage	N/A	PT-1	Siemens	P300	7MF8023-1DA14-1M36-2
			Pressure Gage	N/A	PT-2	Siemens	P300	7MF8023-1DA14-1M36-2
			Gate Valve	AVR 4"	GV-8	AVR		
			Gate Valve	AVR 4"	GV-9	AVR		
			Gate Valve	AVR 6"	GV-3	AVR		
			Gate Valve	AVR 6"	GV-2	AVR		
			Gate Valve	AVR 10"	GV-4	AVR		
			Gate Valve	AVR 12"	GV-1	AVR		
			Butterfly Valve	10"	BFV-5	Valmatic		
			Butterfly Valve	6"	BFV-6	Valmatic		
			Butterfly Valve	6"	BFV-7	Valmatic		
			Check Valve	SurgeBuster Swing Check Valve 6"		Valmatic	7206	
			Check Valve	SurgeBuster Swing Check Valve 6"		Valmatic	7206	
			Check Valve	SurgeBuster Swing Check Valve 10"		Valmatic	7210	
			Pressure Reducing Valve	TBD	PSV-1	Singer	106-RPS	508-198
			Flow Meter	Sitrans F M Magflo	FM-1	Siemens	MAG500	
			Electric Water Heater	Rheem Ruud Electric Water Heater		Rheem Ruud		

**Missing inventory data to be collected during next scheduled inspection*

ASSET MANAGEMENT INSPECTION REPORT

Fairmount Booster Pumping Station

1535 Fairmount Blvd, Peterborough ON

Peterborough Utilities Commission

July 2022

Inspectors: J. Sayles & A. Park

UTILITIES
PETERBOROUGH
COMMISSION

WATER
RIVERVIEW PARK AND ZOO

Peterborough Utilities Commission

1867 Ashburnham Drive, Peterborough, Ontario

Partners in Peterborough Green-Up

Asset Management Inspection Results – 2022

STATION: Fairmount Booster Pumping Station

ADDRESS: 1535 Fairmount Blvd

BUILT: 1997

SERVICE: Zone 2 to Zone 3W

LATITUDE: 44.306010 degrees

LONGITUDE: 78.351090 degrees

PUMP 1: Worthington 10M41-1, 50.5 L/s @ 38.1 m head (Peaking)

PUMP 2: Worthington 10H75-1, 94.6 L/s @ 38.1 m head (Duty)

PUMP 3: Worthington 10H75-1, 94.6 L/s @ 38.1 m head (Duty)

CONTROLS: SCADA

ELEVATION: 243.6 m

OVERALL CONDITION: GOOD

BUILDING AND PROCESS STRUCTURAL – GOOD CONDITION

The Fairmount Booster Pumping Station is the only booster pumping station in Peterborough with a building and below grade pumps. The only equipment above grade is the generator, SCADA and electrical equipment. The pumps and other equipment are accessible by stairs that lead below grade. Since its construction in 1997, no changes have been made to the building or infrastructure other than routine maintenance. The building is in good condition and no major building and process structural concerns were identified.

BUILDING ARCHITECTURAL – GOOD CONDITION

The station is a one-story building with a lower level. There is a decorative finish on the exterior. It has a flat roof, finished with a chain link fence around a radio antenna. There is a tree line to the north of the station that separates the station from a residential area. There are two (2) small retaining walls on either side of the front door made of stone blocks. To the south of the building, there is a parking lot adjacent to Fairmount Blvd and Westbrook Dr. that can accommodate three (3) vehicles. The station has two (2) vents which are not blocked or covered by any obstacles. All walls, interior, exterior, and floors are clean and do not need cleaning, painting or replacement.

BUILDING SERVICES – GOOD CONDITION

No deficiencies in power supply, lighting, heating, or drainage were expected or observed. The building is well ventilated with exhaust fans, complete with automatic louvers. Exterior lights are controlled by a light switch from inside and the main access door is secured with a lock. A fire extinguisher is accessible immediately inside of the access door. At the time of inspection, all services related to the building appeared to be in good repair.

SITE WORKS – GOOD CONDITION

This site is located at the intersection of Fairmount Blvd. and Westbrook Dr. There is no fence surrounding the property for security purposes as it is in a residential neighbourhood. There are a few mature trees behind the building. The asphalt driveway and parking lot are in good condition. The remainder of the site is sodded with regular lawn cutting being completed by a third-party vendor.

PROCESS PIPING – FAIR CONDITION

All the piping in the station is in fair to good condition. The station is functioning satisfactorily, and it is not recommended that the pipes be replaced. No deficiencies were observed at the time of the inspection.

PROCESS MECHANICAL – GOOD CONDITION

The station has a diesel generator, which is used to supply power to the pumps in the event of a power outage. The generator is in good condition and does not need to be replaced. All gate valves, butterfly valves, check valves and air release valves are in good condition.

SCADA – GOOD CONDITION

The SCADA monitoring system includes the following:

One (1) Door Alarm
One (1) Inlet Pressure Monitor
One (1) Outlet Pressure Monitor
One (1) Motor Control Centre
One (1) Flood Water Alarm
One (1) Flow Monitor
One (1) Generator Control
One (1) Generator Battery Low Voltage
One (1) Generator Fault Alarm
One (1) Generator Transfer Switch
One (1) Generator Fuel Tank Alarm
One (1) Low Building Temperature
One (1) Heat/Fire Alarm
One (1) AC Power Alarm
One (1) Diesel Tank Leak Alarm

All SCADA components are in good condition and do not need to be replaced.

PHOTOS

Figure 1: 192 kW generator

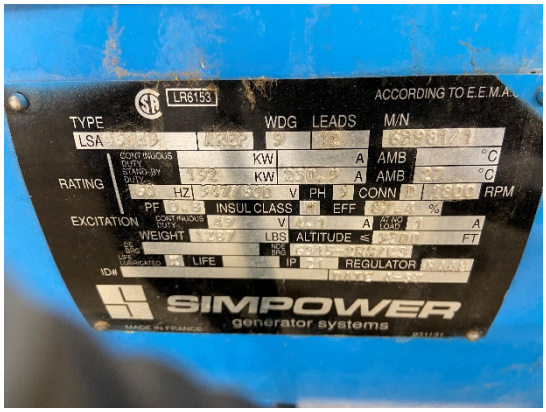

Figure 2: Label on generator

Figure 3: Electrical and SCADA equipment

Figure 4: Ventilation system for generator

Figure 5: Vent

Figure 6: View in the basement of the station facing southeast

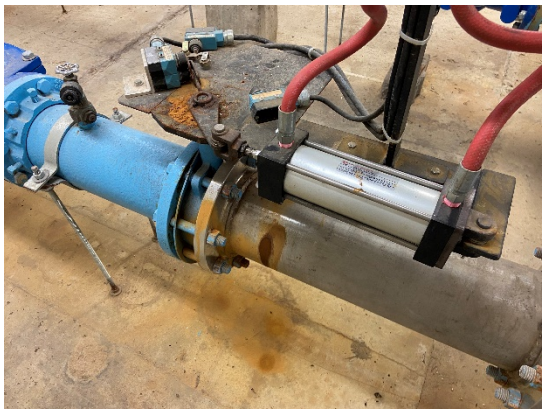

Figure 7: Butterfly valve on pump 1 (discharge)

Figure 8: Check valve on pump 1

Figure 9: Pump 1

Figure 10: Label on pump 1

Figure 11: Butterfly valve on pump 1 (suction)

Figure 12: Butterfly valve on pump 2 (suction)

Figure 13: Pump 2

Figure 14: Label on pump 2

Figure 15: Butterfly valve on pump 3 (discharge)

Figure 16: Check valve on pump 2

Figure 17: Gate valve on pump 2

Figure 18: Coupling on pump 3

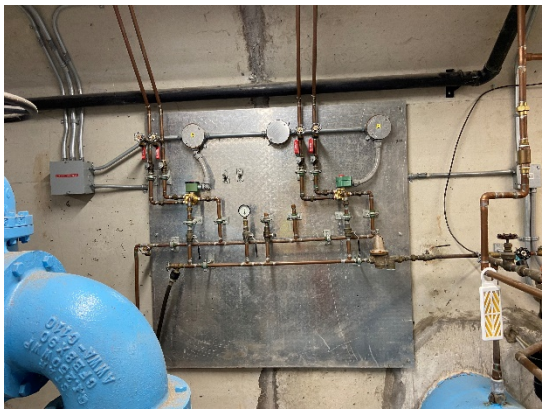

Figure 19: Pump controls

Figure 20: Exhaust Fan

Figure 21: Pump 3

Figure 22: Label on pump 3

Figure 23: Pressure release valve

Figure 24: Label on pressure release valve

Figure 25: Controller

Figure 26: Gate valve on pressure release valve

Figure 27: Discharge butterfly valve of pump 3 and pressure reducing valve

Figure 28: Discharge gate valve on pressure release valve

Figure 29: View of station facing northeast

Asset Inventory List					
RMOH ID	**Equipment**	**Description**	**Manufacturer**	**Model Number**	**Serial Number**
BPS5	Pump 1	TBD	Armstrong		HU7098027009
	Pump 2	TBD	Armstrong		GU7097004003
	Pump 3	TBD	Pleuger	M8-58-2	3346428403
	Generator	192 kW 230.9 A 60 Hz 87.4% Eff	Simpower	63981/1	
	Exhaust Fan	Complete with Louver			
	Pressure Gauge	N/A			
	Pressure Gauge	N/A			
	Butterfly Valve	6"			
	Butterfly Valve	6"			
	Butterfly Valve	6"			
	Butterfly Valve	8" Controlled with hydraulic cylinder			
	Butterfly Valve	8" Controlled with hydraulic cylinder			
	Gate Valve	8"			
	Gate Valve	8"	Mueller		
	Gate Valve	8"	Mueller		
	Check Valve	6" 250 MAX PSI	Valmatic	7206	
	Check Valve	6" 250 MAX PSI	Valmatic	7206	
	Pressure Reducing Valve	8" 250 PSI MAX	Singer	L0-RPS	897-74
	Flow Meter	TBD			

**Missing inventory data to collected during next scheduled inspection*

ASSET MANAGEMENT INSPECTION REPORT

Greencrest Booster Pumping Station

1221 Sherbrooke St, Peterborough ON

Peterborough Utilities Commission

July 2022

Inspectors: J. Sayles & A. Park

UTILITIES
PETERBOROUGH
COMMISSION

WATER
RIVERVIEW PARK AND ZOO

Peterborough Utilities Commission

1867 Ashburnham Drive, Peterborough, Ontario

Partners in Peterborough Green-Up

Asset Management Inspection Results – 2022

STATION: Greencrest Booster Pumping Station

ADDRESS: 1221 Sherbrooke St

BUILT: 2017

SERVICE: Zone 2 to Zone 3W

LATITUDE: 44.294247 degrees

LONGITUDE: 78.352032 degrees

PUMP 1+2: G&L Pump Series – AC 8100, 60 L/s @ 40 m head

CONTROLS: SCADA

ELEVATION: 249 m

OVERALL CONDITION: VERY GOOD

BUILDING AND PROCESS STRUCTURAL – VERY GOOD CONDITION

The Greencrest Booster Pumping Station is the newest station in Peterborough as it was built in 2017, replacing an aging below grade facility. Since its construction, no changes have been made to the building or infrastructure other than routine maintenance. All equipment in the station is above grade except for the 200 mm inflow pipe. The building is in very good condition and no major building and process structural concerns were identified.

BUILDING ARCHITECTURAL – VERY GOOD CONDITION

The station is one-story building made of concrete blocks, finished with bricks on the exterior. On the north and south side of the building and above the front door there are faux architectural windows to help the station fit into its residential area. The industrial front door has a residential finish on the exterior, and it has a light above. On the east exterior wall of the station there is some pink graffiti. The roof is finished with shingles and has a communication antenna. The building borders a tree line to the east. To the south of the building, there is a driveway to Greencrest Dr that can accommodate two (2) cars. There are five (5) yellow bollards between the driveway and the building to provide protection against vehicular traffic. The station has two (2) exhaust vents which are not blocked or covered by any obstacles. All walls, interior and exterior, and floors are clean and do not need cleaning, painting or replacement.

BUILDING SERVICES – VERY GOOD CONDITION

Due to the age of the building, no deficiencies in power supply, lighting, heating, or drainage were expected or observed. The building is well ventilated with exhaust fans, complete with automatic louvers. Exterior lights are controlled by a photocell sensor and the main access door is secured with a smart key doorknob set. A fire extinguisher is accessible immediately inside of the access door. At the time of inspection, all services related to the building appeared to be in very good repair.

SITE WORKS – VERY GOOD CONDITION

This site is located at the intersection of Sherbrooke St. and Greencrest Dr. There is no fence surrounding the property for security purposes as it is in a residential neighbourhood. The site generally drains away from the building to the north, west and south. A cutoff swale along the east side directs surface runoff away from the building. There are a few mature trees on the site. The asphalt driveway and parking lot

are in good condition. The remainder of the site is sodded with regular lawn cutting being completed by a third-party vendor.

PROCESS PIPING – VERY GOOD CONDITION

All the piping in the station is 316 stainless steel and is in very good condition as the station is only 5 years old. The station is functioning satisfactorily, and it is not recommended that the pipes be replaced. No deficiencies were observed at the time of the inspection.

PROCESS MECHANICAL – VERY GOOD CONDITION

The station does not have a generator, however, it has 240 V external receptacle in which a portable genset can be connected in the case of an emergency. All gate valves, butterfly valves, check valves and air release valves are in very good condition.

SCADA – VERY GOOD CONDITION

The SCADA monitoring system includes the following:

One (1) Door Alarm
One (1) Inlet Pressure Monitor
One (1) Outlet Pressure Monitor
One (1) Motor Control Centre
One (1) Floor Sump Pump Flood Alarm
One (1) Low Building Temperature Alarm
One (1) Heat/Fire Alarm
One (1) Commercial Power Loss Alarm

All SCADA components are in very good condition and do not need to be replaced.

PHOTOS

Figure 1: View of station facing northeast

Figure 2: 8" suction gate valve on pump 1

Figure 3: Pump 1

Figure 4: Label on pump 1

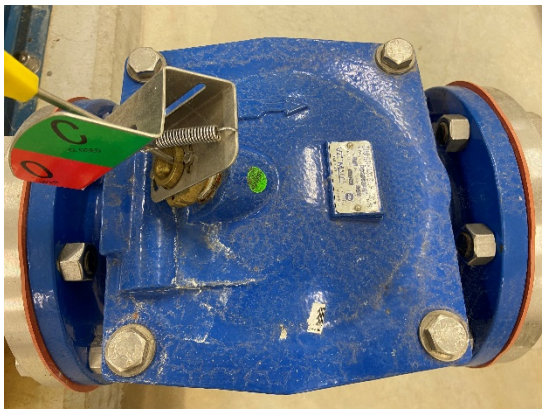

Figure 5: Check valve on pump 1

Figure 6: 6" discharge gate valve on pump 1

Figure 7: 8" suction gate valve on pump 2

Figure 8: Pump 2

Figure 9: Label on pump 2

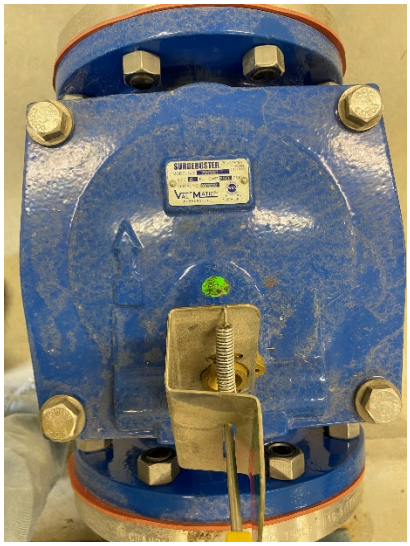

Figure 10: Check valve on pump 2

Figure 11: 6" discharge gate valve on pump 2

Figure 12: Flow meter

Figure 13: Discharge pressure gauge (Zone 3)

Figure 14: Air release valve

Figure 15: Discharge gate valve on pressure reducing valve

Figure 16: Pressure reducing valve

Figure 17: Suction gate valve on pressure reducing valve

Figure 18: Suction air release valve on pressure reducing valve

Figure 19: Suction pressure gauge (Zone 2)

Figure 20: 8" suction gate valve

Figure 21: View of station facing northwest

Figure 22: SCADA and electrical cabinet

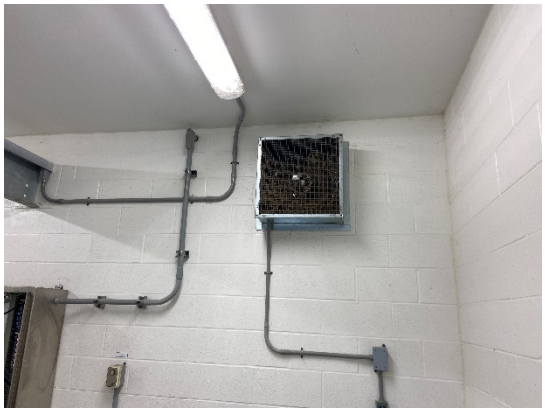

Figure 23: Exhaust fan on east wall

Figure 24: Electrical equipment on south wall

Figure 25: Graffiti on east wall

Figure 26: 240 V Receptacle (Portable Genset)

Asset Inventory List					
RMOH ID	**Equipment**	**Description**	**Manufacturer**	**Model Number**	**Serial Number**
BPS6	Pump 1	G&L Pump Series - AC 8100, 60 L/s @ 40 m	G&L	150	QFG980-01
	Pump 2	G&L Pump Series - AC 8100, 60 L/s @ 40 m	G&L	150	QFG980-02
	Digital Pressure Gauge	Sitrans	Siemens		P310
	Digital Pressure Gauge	Sitrans	Siemens		P310
	Gate Valve	8"	Mueller		
	Gate Valve	8"	Mueller		
	Gate Valve	8"	J&S		
	Gate Valve	6"	J&S		
	Gate Valve	6"	J&S		
	Gate Valve	4"	J&S		
	Gate Valve	4"	J&S		
	Check Valve	Surge Buster 250 MAX PSI	Valmatic	7206C	M665200
	Check Valve	Surge Buster 250 MAX PSI	Valmatic	7206C	M665200
	Pressure Relief Valve	Model 106 RPS	Singer	106-RPS	06170160-1
	Combination Air Valve	Series 200C 300 PSI	Valmatic	202C.2DISU	
	Air release valve	Series 38 150 PSI	Valmatic	38.2DISV	
	Flowmeter	Sitrans F M	Valmatic	MAG 3100	114140H317
	Exhaust Fan	N/A			
	Louver Ventilation	N/A			
	Space Heater	N/A			

**Missing inventory data to be collected during next scheduled inspection*

ASSET MANAGEMENT INSPECTION REPORT

Lansdowne Booster Pumping Station

1630 Lansdowne St W, Peterborough ON

Peterborough Utilities Commission

July 2022

Inspectors: J. Sayles & A. Park

UTILITIES
PETERBOROUGH
COMMISSION

WATER
RIVERVIEW PARK AND ZOO

Peterborough Utilities Commission

1867 Ashburnham Drive, Peterborough, Ontario

Partners in Peterborough Green-Up

Asset Management Inspection Results – 2022

STATION: Lansdowne Booster Pumping Station

ADDRESS: 1630 Lansdowne St W

BUILT: 1974

SERVICE: Zone 2 to Zone 3W

LATITUDE: 44.2902869 degrees

LONGITUDE: 78.3116769 degrees

PUMP 1+2: Armstrong 6x6x13, 50.5 L/s @ 38.7 m head

CONTROLS: SCADA

ELEVATION: 243.4 m

OVERALL CONDITION: GOOD

BUILDING AND PROCESS STRUCTURAL – FAIR CONDITION

The Lansdowne Booster Pumping Station is one (1) of five (5) below grade pumping stations in the City of Peterborough. Since its construction in 1974, no changes have been made to the building or infrastructure other than routine maintenance and pump replacement. All equipment in the station is below grade except for the electrical and SCADA equipment. It appears to be in fair condition. No concerns were identified on the surface surrounding the station or below grade in the station.

BUILDING ARCHITECTURAL – GOOD CONDITION

Above grade there is a concrete slab with two (2) hatches and two (2) metal cabinets. The electrical and SCADA equipment are housed in a cabinet. A sampling station is housed in the other. Also on the slab is a small exhaust pipe. The main access hatch is accessible using fall-arrest equipment for entry into the station. The second access is through a concrete lid for maintenance purposes. Below grade, the internal pipes and pumps are in a small concrete chamber, with no architectural features. Some of the pipes, bends, pumps and valves have some discolouration/corrosion due to age.

BUILDING SERVICES – GOOD CONDITION

No deficiencies in power supply, lighting, or heating were observed in the station. The only form of ventilation in the station is the hatch, which provides minimal airflow. The hatch is locked with a padlock, and the is no fire extinguisher in the station. At the time of inspection, all services related to the building appeared to be in fair to good repair.

SITE WORKS – GOOD CONDITION

The Lansdowne Booster Pumping Station is located on at 1360 Lansdowne St West, just east of Applewood Crescent. There is a locked, chain link fence surrounding the station as it is next to a school yard on an arterial road. There are small trees and hedges on the north and east sides of the station, which separates the station from the neighbouring school yard. The area around the station is sodded with regular lawn cutting being completed by a third-party vendor.

PROCESS PIPING – FAIR CONDITION

All the piping in the station is in fair to good condition. The station is functioning satisfactorily, and it is not recommended that the pipes be replaced at this time. No deficiencies were observed at the time of

the inspection. The original configuration of the station included inline pumps. The replacement of the pumps required the fabrication of stainless steel spool pieces to complete the work.

PROCESS MECHANICAL – FAIR CONDITION

There is no generator in the station, and all gate valves, butterfly valves, check valves and air release valves are in fair to good condition. The original pumps were replaced in 2011.

SCADA – GOOD CONDITION

The SCADA monitoring system includes the following:

One (1) access hatch alarm
One (1) inlet pressure monitor
One (1) outlet pressure monitor
One (1) Motor Control Centre
One (1) Flood Water Alarm
One (1) Low Building Temperature
One (1) Heat/Fire Alarm
One (1) Commercial Power Alarm

All SCADA components are in good condition and do not need to be replaced.

PHOTOS

Figure 1: Electrical and SCADA equipment

Figure 2: Above ground view of station facing northeast

Figure 3: Pump controls in southwest corner of the station

Figure 4: View of station facing northwest from ladder

Figure 5: Gate valve on bypass

Figure 6: Check valve on pump 2

Figure 7: Butterfly and check valve on pump 2

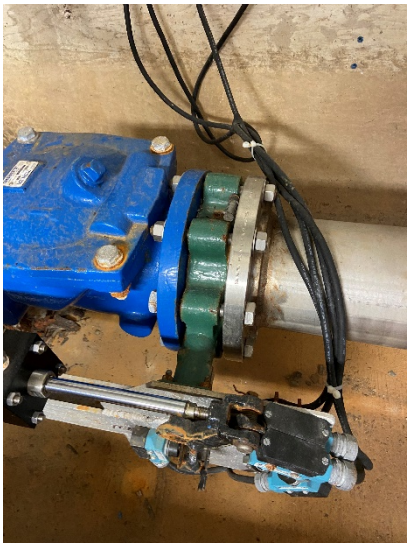

Figure 8: Butterfly and check valve on pump 1

Figure 9: Check valve on pump 1

Figure 10: Pump 1

Figure 11: Label on pump 1

Figure 12: Label on pump 2

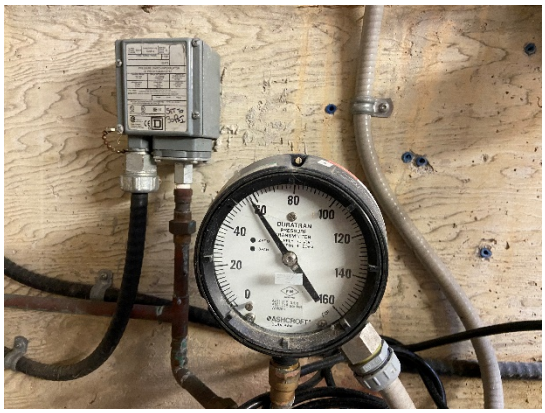

Figure 13: Suction pressure gauge

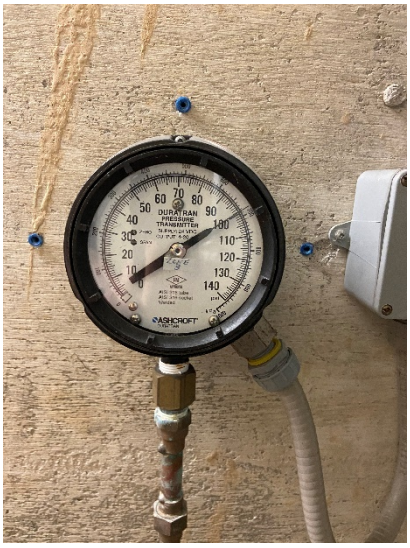

Figure 14: Discharge pressure gauge

Figure 15: View of station facing northwest from ladder

Asset Inventory List					
RMOH ID	**Equipment**	**Description**	**Manufacturer**	**Model Number**	**Serial Number**
BPS7	Pump 1	TBD		M00 103515899	X1111
	Pump 2	TBD		M00 103515899	X1111
	Pressure Gauge	N/A	Ashcroft		
	Pressure Gauge	N/A	Ashcroft		
	Butterfly Valve	8" Controlled with hydraulic cylinder			
	Butterfly Valve	8" Controlled with hydraulic cylinder			
	Gate Valve	TBD			
	Check Valve	Surgebuster 6" 250 MAX PSI	Valmatic	7206	
	Check Valve	Surgebuster 6" 250 MAX PSI	Valmatic	7206	
	Pressure Reducing Valve	3" 250 PSI MAX	Singer	106-RPS	998-158-3

**Missing inventory data to be collected during next scheduled inspection*

ASSET MANAGEMENT INSPECTION REPORT

Scollard Booster Pumping Station

1370 Scollard Dr, Peterborough ON

Peterborough Utilities Commission

July 2022

Inspectors: J. Sayles & A. Park

UTILITIES
PETERBOROUGH
COMMISSION

WATER
RIVERVIEW PARK AND ZOO

Peterborough Utilities Commission

1867 Ashburnham Drive, Peterborough, Ontario

Partners in Peterborough Green-Up

Asset Management Inspection Results – 2022

STATION: Scollard Booster Pumping Station

ADDRESS: 1370 Scollard Dr

BUILT: 1996

SERVICE: Zone 1 to Zone 1B

LATITUDE: 44.3365775 degrees

LONGITUDE: 78.3051935 degrees

PUMP 1: Crown S6-75, 4.3 L/s @ 13.7 m head (Duty)

PUMP 2: Crown 6L-160, 9.5 L/s @ 13.7 m head (Peak)

CONTROLS: SCADA

ELEVATION: 210.5 m

OVERALL CONDITION: FAIR

BUILDING AND PROCESS STRUCTURAL – FAIR CONDITION

The Scollard Booster Pumping Station is one (1) of five (5) below grade pumping stations in the City of Peterborough. Since its construction in 1996, no changes have been made to the building or infrastructure other than routine maintenance. Pump #1 was replaced in 2009 and pump #2 was replaced in 2011. All equipment in the station is below grade except for the electrical and SCADA equipment and appears to be in fair condition. No concerns were identified on the surface surrounding the station or below grade in the station.

BUILDING ARCHITECTURAL – GOOD CONDITION

Above grade there is a metal hatch and cabinet. Beside the hatch, there are hedges following the property line that the station borders. There is no driveway as the station is located on a residential road adjacent to the roadway. Below grade, the internal pipes and pumps are in a concrete chamber, with no architectural features.

BUILDING SERVICES – FAIR CONDITION

No deficiencies in power supply, lighting, or heating were observed in the station. There is a ventilation system. The main access hatch is accessible using fall arrest equipment for entry into the station. The hatch is locked with a key, and there is no fire extinguisher in the station. At the time of inspection, all services related to the building appeared to be in fair to good repair.

SITE WORKS – GOOD CONDITION

The Scollard Booster Pumping Station is located on Scollard Dr. just south of Frances Stewart Rd. There are no fences surrounding the station as it is in a residential area. The area around the station is sodded with regular lawn cutting being completed by City staff.

PROCESS PIPING – FAIR CONDITION

All pipes and bends are in fair condition. Where a pump or valve has been replaced, stainless steel spool pieces have been fabricated. The station is functioning satisfactorily, and it is not recommended that the pipes be replaced. No deficiencies were observed at the time of the inspection.

PROCESS MECHANICAL – FAIR CONDITION

There is no generator in the station, and all gate valves, butterfly valves, check valves and air release valves are in fair condition.

SCADA – GOOD CONDITION

The SCADA monitoring system includes the following:

One (1) Access Hatch Alarm
One (1) Inlet Pressure Monitor
One (1) Outlet Pressure Monitor
One (1) Flow Monitor
One (1) Motor Control Centre
One (1) Flood Water Alarm
One (1) Heat/Fire Alarm
One (1) Commercial Power Alarm

All SCADA components are in good condition and do not need to be replaced.

PHOTOS

Figure 1: View of station facing northeast

Figure 2: View of butterfly valves

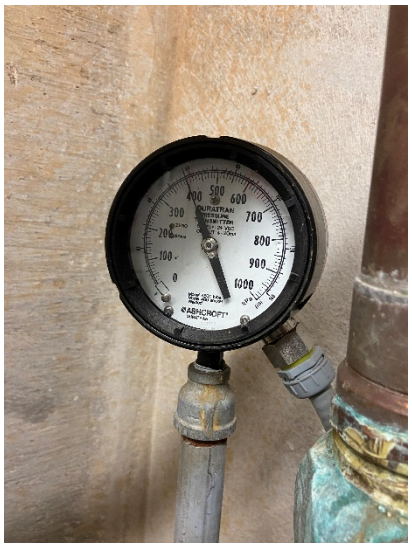

Figure 3: Suction pressure gauge (Zone 1)

Figure 4: Butterfly valve on pressure reducing valve (discharge)

Figure 5: Butterfly control valve on pump 1

Figure 6: Butterfly control valve on pump 2

Figure 7: 6" Pressure reducing valve

Figure 8: Label on 6" pressure reducing valve

Figure 9: Pump 1 (left) and pump 2 (right)

Figure 10: Label on pump 1

Figure 11: Label on pump 2

Figure 12: Automatic valve controls

Figure 13: Butterfly valve on pressure reducing valve (suction)

Figure 14: Check valve on by-pass

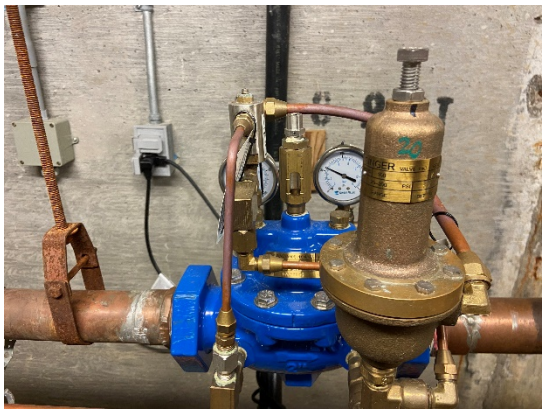

Figure 15: 2" Pressure reducing valve

Figure 16: Label on 2" pressure reducing valve

Figure 17: Electrical and SCADA box above station

Figure 18: Exhaust Fan

Figure 19: Butterfly valve on pump 1 (suction)

Figure 20: Butterfly valve on pump 2 (suction)

Figure 21: Water Meter

Figure 22: View of station facing northwest

Asset Inventory List					
RMOH ID	**Equipment**	**Description**	**Manufacturer**	**Model Number**	**Serial Number**
BPS8	Pump 1	Crown S6-75, 4.3 L/s @ 13.7 m			1019602766
	Pump 2	Crown 6L-160, 9.5 L/s @ 13.7 m		HEI82TCDW7074AA.M	
	Pressure Gauge	N/A	Ashcroft		
	Pressure Gauge	N/A	Ashcroft		
	Butterfly Valve	8" Controlled with hydraulic cylinder			
	Butterfly Valve	8" Controlled with hydraulic cylinder			
	Butterfly Valve	4" Wafer style			
	Butterfly Valve	4" Wafer style			
	Gate Valve	TBD			
	Check Valve	6"			
	Pressure Reducing Valve	4" 250 PSI MAX	Singer	106-RPS	400-96
	Pressure Reducing Valve	2" 400 PSI MAX	Singer	106-PR-C	03160041-1

**Missing inventory data will be collected during next scheduled inspection*

ASSET MANAGEMENT INSPECTION REPORT

Water St Booster Pumping Station

1180 Water St, Peterborough ON

Peterborough Utilities Commission

August 2022

Inspectors: J. Sayles & A. Park

UTILITIES
PETERBOROUGH
COMMISSION

WATER
RIVERVIEW PARK AND ZOO

Peterborough Utilities Commission

1867 Ashburnham Drive, Peterborough, Ontario

Partners in Peterborough Green-Up

Asset Management Inspection Results – 2022

STATION: Water St Booster Pumping Station

ADDRESS: 1320 Water St

BUILT: 1909

SERVICE: Zone 1

LATITUDE: 44.345636 degrees

LONGITUDE: 78.3079214 degrees

PUMPS 1+2: Dominion Engineering Type H Ser NO. 287 (#2710), 171 L/s @ 74.7 m head

PUMP 3: Cameron Centrifuge Ser NO. 4559K, 315.5 L/s @ 74.7 m head

PUMP 4: Dominion Engineering #3430, 197.2 L/s @ 74.7 m head

PUMP 5: De Laval P1210/10D, 210.7 L/s @ 74.7 m head

CONTROLS: SCADA

ELEVATION: 208 m

OVERALL CONDITION: POOR

BUILDING AND PROCESS STRUCTURAL – POOR CONDITION

The Water St. Pumphouse is the oldest pumping station in Peterborough. Since its construction, there have been several changes made to the pumps, valves and generators. As changes have been made, the piping has been updated. All piping and valves are below grade. The generators and pumps are on the main floor with the waterwheels and turbines below grade. The exterior of the pumphouse underwent restoration in 2019 with concrete and brick/block repointing and painting. The overall condition of the pumphouse is poor to fair, with typical condition issues of a building its age.

BUILDING ARCHITECTURAL – FAIR CONDITION

The pumphouse was constructed as part of the dam on the Otonabee River. The restoration work completed in 2019 has improved the overall appearance. The waterproof membrane on the flat roof was replaced in 2016 and is in good condition. The building is a single story with a mezzanine in the east portion of the building that is exhibiting severe concrete deterioration. There are large windows to the north, west and south. The pumphouse borders the Riverview Park and Zoo train ride, which travels across the dam on the north side of the station. On the west side of the building is a paved driveway that can accommodate two (2) vehicles. The lower level is damp. Lighting is adequate. Water damage from leaking pipes on the walls and floors is throughout.

BUILDING SERVICES – POOR CONDITION

Deficiencies in power supply, lighting, or heating are expected due to age. There is a pipe in the basement that is constantly leaking, which staining the floor below it. The building is well ventilated with large doors at the west end and operable windows along the north and south walls. The pumps and generators are electric with no fossil fuel burning equipment on site. Lighting is provided by the south facing windows during the day and overhead lighting during the night. On the lower level, lighting is provided by overhead fluorescent lights. The main access door is locked with a smart key doorknob set. Earplugs are available

upon entry. At the time of inspection, all services related to the building appeared to be in poor to fair repair.

SITE WORKS – GOOD CONDITION

The Water St. Pumphouse is located on Water St on the south side of the Riverview Park and Zoo. There is a fence surrounding the property as it is located on a dam. The asphalt driveway and parking lot are in good condition. The remainder of the site is sodded with regular lawn cutting being completed by the Zoo staff.

PROCESS PIPING – POOR CONDITION

The majority of the piping in the lower level is the original ductile iron. Where valves have been removed or replaced, stainless steel and PVC pipe have been used. There is some discolouration and rust on the piping due to age and environmental factors. The facility is functioning satisfactorily, and it is not recommended that the pipes be replaced at this time. No major deficiencies were observed at the time of the inspection. The process piping is in poor to fair condition due to age.

PROCESS MECHANICAL – POOR CONDITION

The pumps, turbines, waterwheels, gear increasers and decreasers are all in working condition, however, are at the end of their serviceable design life. Pump one (1) and two (2) were installed in 1945. Pump four was installed in 1935. The age of pumps three (3) and five (5) are unknown. The generators are in fair condition. The gate valves, butterfly valves and check valves have some discolouration and surface rust due to age and environmental factors. The process mechanical equipment is in poor to fair condition.

SCADA EQUIPMENT – GOOD CONDITION

The SCADA monitoring system includes the following:

One (1) door alarm
One (1) flow monitor
One (1) pressure monitor
One (1) Heat/Fire Alarm
One (1) Pipe Gallery Flood Alarm
One (1) Commercial Power Alarm
One (1) River Level Loss of Echo Alarm
One (1) PH Inside Racks Loss of Echo Alarm
One (1) Tail Water Loss of Echo Alarm
One (1) Low Building Temperature Alarm
One (1) Raw Water Chamber Flood Alarm

All SCADA components are in good condition and do not need to be replaced.

PHOTOS

Figure 1: Pump 1 18" suction gate valve

Figure 2: Pump 1 16" discharge butterfly valve

Figure 3: 24" butterfly valve

Figure 4: Pump 1 12" discharge check valve

Figure 5: 20" gate valve

Figure 6: Pump 2 18" suction gate valve

Figure 7: Pump 2 16" discharge butterfly valve

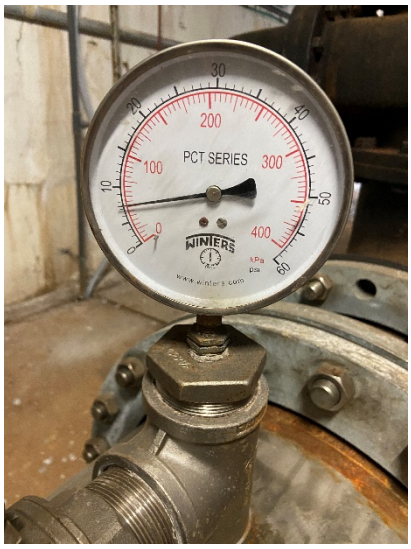

Figure 8: Suction pressure gauge

Figure 9: Pump 2 12" discharge check valve

Figure 10: Pump 3 16" suction gate valve

Figure 11: Pump 3 16" discharge butterfly valve

Figure 12: 20" butterfly valve

Figure 13: Label on butterfly valve

Figure 14: 20" butterfly valve

Figure 15: View of station's basement facing west

Figure 16: View of station's basement facing east

Figure 17: Zone 1 discharge gate valve

Figure 18: 20" gate valve

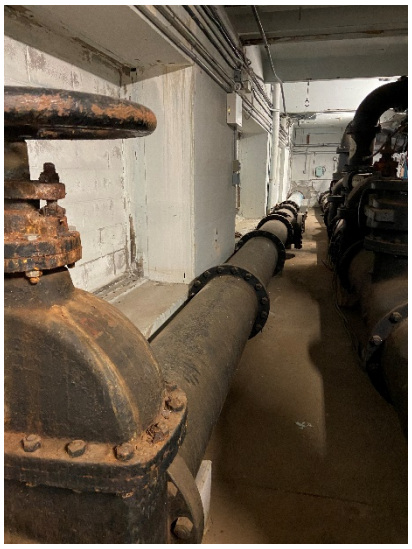

Figure 19: Zone 1 discharge

Figure 20: Gate valve on tee

Figure 21: 20" discharge gate valve

Figure 22: Pump 4 10" discharge gate valve

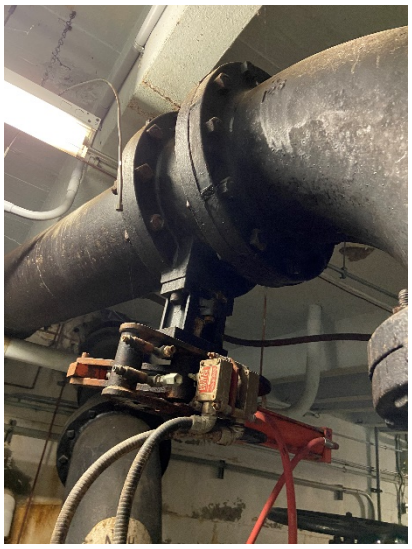

Figure 23: Pump 4 suction butterfly valve

Figure 24: Zone 1 20" discharge gate valve

Figure 25: Pump 5 16" discharge gate valve

Figure 26: Zone 1 discharge

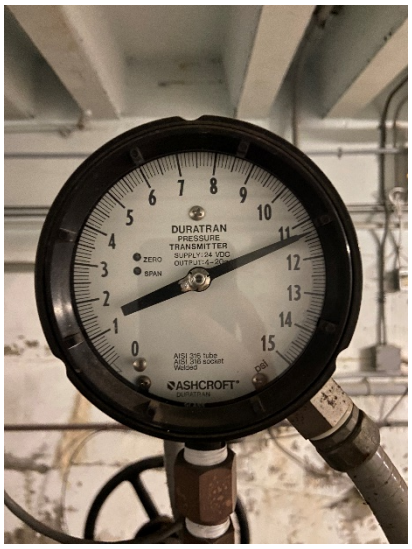

Figure 27: Zone 1 pressure

Figure 28: Suction gate valve

Figure 29: Out of use gate valve

Figure 30: Disused gate valve

Figure 31: Pump 4 suction butterfly valve

Figure 32: Pump 4 suction pipe

Figure 33: Darin 20" gate valve

Figure 34: Label on generator 5

Figure 35: Suction gate valve

Figure 36: 24" butterfly valve

Figure 37: View of station's basement facing east

Figure 38: 30" butterfly valve

Figure 39: Suction from water treatment plant

Figure 40: View of station's basement facing southeast

Figure 41: Pump 5 and motor

Figure 42: 10" butterfly valve on pump 5 with hydraulic controls

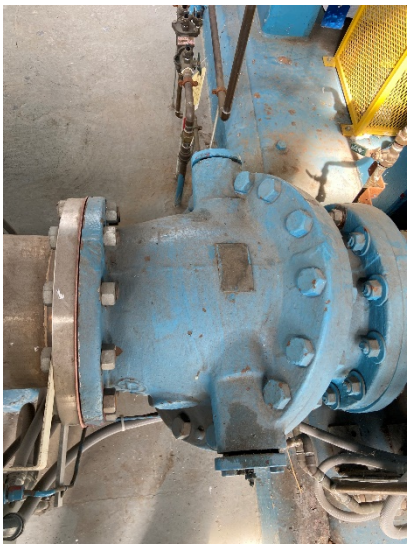

Figure 43: Pump 5 10" check valve

Figure 44: Pump 5 label

Figure 45: Pump 5 12" gate valve

Figure 46: Label on pump 5 motor

Figure 47: Pump 4 and motor

Figure 48: Label on pump 4 gear increaser

Figure 49: Pump 4 check valve

Figure 50: Label on pump 4

Figure 51: Generator 3

Figure 52: Generator 3 gear box

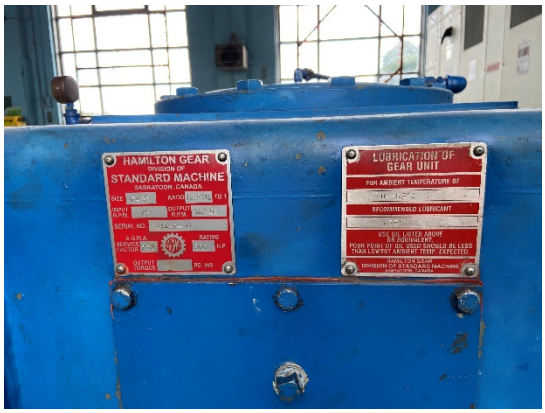

Figure 53: Label on generator 3

Figure 54: Pump 3 and motor

Figure 55: 10" check valve on pump 3

Figure 56: Label on pump 3 motor

Figure 57: Label on pump 3

Figure 58: Pump 3

Figure 59: Pump 2 and motor

Figure 60: Gear increaser on pump 2

Figure 61: Label on gear increaser

Figure 62: 8" gate valve on pump 2

Figure 63: Pump 2

Figure 64: Label on pump 2

Figure 65: Pump 1 and motor

Figure 66: Label on pump 1 gear increaser

Figure 67: 8" gate valve on pump 1

Figure 68: Pump 1

Asset Inventory List							
RMOH ID	Equipment	Description	Label	Function Location	Manufacturer	Model Number	Serial Number
	Pump 1	TBD			Dominion		238
	Pump 2	TBD			Dominion		238
	Pump 3	TBD			Cameron Centrifuge	4559-K	
	Pump 4	TBD			Dominion		201
	Pump 5	TBD			De Laval	260417	
	Gate Valve	8"			Jenkins		
	Gate Valve	8"			Jenkins		
	Gate Valve	12"			Darling		
	Gate Valve	18"		Suction			
	Gate Valve	20"		Suction			
	Gate Valve	18"		Suction			
	Gate Valve	16"		Suction			
	Gate Valve			Discharge	Darling		
	Gate Valve	20"	D-6	Discharge			
	Gate Valve	20"	D-7	Discharge			
	Gate Valve	20"		Discharge			
	Gate Valve	10"	D-8	Discharge			
	Gate Valve	20"	D-9	Discharge			
	Gate Valve	16"	D-10	Discharge			
	Gate Valve	TBD		Suction			
	Gate Valve	TBD		Suction			
	Gate Valve	TBD		Suction			
	Gate Valve	TBD	S-8	Suction			
	Gate Valve	20"	Drain				
	Gate Valve	30"		Suction			
	Butterfly Valve	16"		Discharge	Jenkins		
BPS9	Butterfly Valve	16"		Discharge	Jenkins		
	Butterfly Valve	16"		Discharge	Jenkins		
	Butterfly Valve	20"		Discharge	Jenkins		
	Butterfly Valve	20"		Discharge	Jenkins		
	Butterfly Valve	20"		Suction	PRATT		
	Butterfly Valve	24"		Suction			
	Butterfly Valve	24"		Suction			
	Butterfly Valve	10" with hydraulics		Discharge	Milwauke	CL17-SE	
	Butterfly Valve	10" with hydraulics		Discharge			
	Butterfly Valve	10" with hydraulics		Discharge			
	Butterfly Valve	TBD		Discharge			
	Butterfly Valve	TBD		Suction	Darling		
	Check Valve	12"		Discharge			
	Check Valve	12"		Discharge			
	Check Valve	10"			Dominion		
	Check Valve	10"					
	Check Valve	10"					
	Check Valve	10"					
	Speed Increasor	Turbine			Dominion		10012
	Electric Motor	TBD			General Electric		
	Speed Increasor	Turbine			Dominion		STK 54
	Speed Increasor	Trubine					
	Generator	TBD	1				
	Generator	TBD	3				
	Generator	TBD	5				
	Generator	TBD					
	Gear Increasor	TBD					
	Space Heaters	N/A					

**Missing inventory data to be collected during next scheduled inspection*

ASSET MANAGEMENT INSPECTION REPORT

Clonsilla Reservoir

775 Sherbrooke St, Peterborough ON

Peterborough Utilities Commission

August 2022

Inspectors: J. Sayles & A. Park

UTILITIES
PETERBOROUGH
COMMISSION

WATER
RIVERVIEW PARK AND ZOO

Asset Management Inspection Results – 2022

STATION: Clonsilla Reservoir

ADDRESS: 775 Sherbrooke St

BUILT: 1965

SERVICE: Zone 1

LATITUDE: 44.294830 degrees

LONGITUDE: 78.342650 degrees

CAPACITY: 18.18 ML

CONTROLS: SCADA

HIGH WATER LEVEL: 214.6 m

LOW WATER LEVEL: 208.8 m

DIMENSIONS: 56 x 56 x 5.9 m

ELEVATION: 208.8 m

PUMP 1+2: Allis-Chalmer SHN-V, 87.6 L/s @ 41.1 m head

PUMP 3: Allis-Chalmer SJ-V, 52.6 L/s @ 41.1 m head

PUMP 4: Allis-Chalmer SG-V, 219.1 L/s @ 41.1 m head

OVERALL CONDITION: FAIR

BUILDING AND PROCESS STRUCTURAL – POOR CONDITION

The Clonsilla Reservoir is the oldest reservoir in Peterborough, constructed in 1965. Since its construction, no changes have been made to the building or infrastructure other than routine maintenance. All equipment in the station is below grade except for the diesel motor that powers pump #4, the chlorine booster station, a shower/eye wash station and the electrical and SCADA equipment. The exterior of the building is showing signs of aging with the precast concrete panel roof deteriorating prematurely. The steel railing attached to the roof may become unsafe due to the condition of the precast concrete roof panels. The building condition is in fair to poor.

BUILDING ARCHITECTURAL – FAIR CONDITION

The bottom of the reservoir sits below grade and the top of the reservoir is landscaped and sodded. All equipment is accessible on the east side of the reservoir. The east face of the building is a decorative stone façade with signs of aging. All other aspects of the station are industrial with a utilitarian appearance. The reservoir has no trees around it, and it borders the Parkway trail and Kinsmen Arena. On the east side of the reservoir entrance, there is a gravel driveway that can accommodate three (3) vehicles. The station has an exhaust system for the diesel motor which is not blocked or covered by any obstacles. Some paint on the interior walls is peeling and revealing the concrete wall. Under the pumps, there are stains from leaking water while the pumps are running. The interior walls require a general cleaning and fresh paint.

BUILDING SERVICES – FAIR CONDITION

No deficiencies in power supply, lighting, or heating were expected or observed. Water from leaking pumps pools on the floor below. The building has one (1) louvered vent, above the front door. The exterior light is controlled by a switch and the main access door is secured with a smart key doorknob set. A fire extinguisher is accessible immediately inside of the access door. An emergency shower and eyewash

station are available just inside the entrance of the building. At the time of inspection, all services related to the building appeared to be in fair to good repair.

SITE WORKS – GOOD CONDITION

The Clonsilla Reservoir is located on Kinsmen Way on the north side of the parking lot for the Kinsmen Arena. The area around the reservoir and on top is sodded with regular lawn cutting being completed by a third-party vendor. Immediately east of the reservoir entrance is the Clonsilla Booster Pump Station.

PROCESS PIPING – FAIR CONDITION

All the piping in the station is ductile iron and is in fair to good condition. There is discouloration/corrosion and rust on some pipes and valves. The station is functioning satisfactorily, and it is not recommended that the pipes be replaced. No deficiencies were observed at the time of the inspection.

PROCESS MECHANICAL – FAIR CONDITION

The station has a diesel motor, which is used to power pump four (4). The motor is in fair to good condition and does not need to be replaced. All gate valves, butterfly valves, check valves and air release valves are in fair to good condition.

SCADA – GOOD CONDITION

The SCADA monitoring system includes the following:

One (1) Door Alarm
Two (2) Zone Pressure Monitors
One (1) Outlet Pressure Monitor
One (1) Flow Monitor
One (1) Building Flood Alarm
One (1) Diesel P4 Battery Low Voltage Alarm
One (1) Diesel P4 Panel Fault Alarm
One (1) Chlorine Residual Monitor
One (1) Commercial Power Alarm
One (1) Chlorine Gas Detector Alarm
One (1) Heat/Fire Alarm
One (1) Low Building Temperature Alarm
One (1) High Building Temperature Alarm
One (1) Fuel Tank Alarm
One (1) Eye Wash in Use Alarm
One (1) Metering Chamber Flood Alarm
One (1) Motor Control Centre
One (1) Flood Water Alarm

All SCADA components are in good condition and do not need to be replaced.

PHOTOS

Figure 1: Cracks in concrete roof

Figure 2: Cracks in concrete roof

Figure 3: Cracks in concrete roof

Figure 4: Cracks in concrete roof

Figure 5: Cracks in concrete roof

Figure 6: Pump 4 motor

Figure 7: Electrical cabinets

Figure 8: Pump 4 drive

Figure 9: Electrical control box

Figure 10: Chlorine injection system

Figure 11: Chlorine scale

Figure 12: Label on chlorine scale

Figure 13: View of pumps from above

Figure 14: Pump 1 and butterfly valve

Figure 15: Label on butterfly valve

Figure 16: Pump 1

Figure 17: Label on pump 1

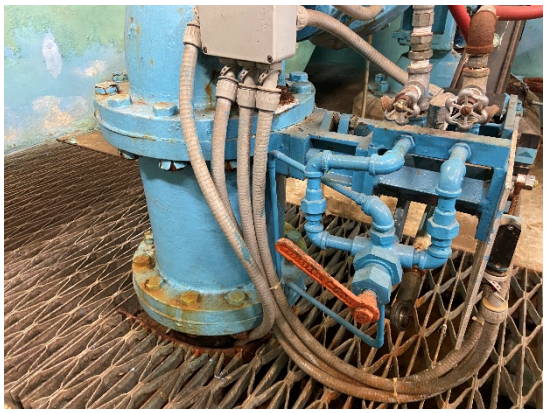

Figure 18: Hydraulic butterfly valve on pump 1

Figure 19: Gate valve on pump 1

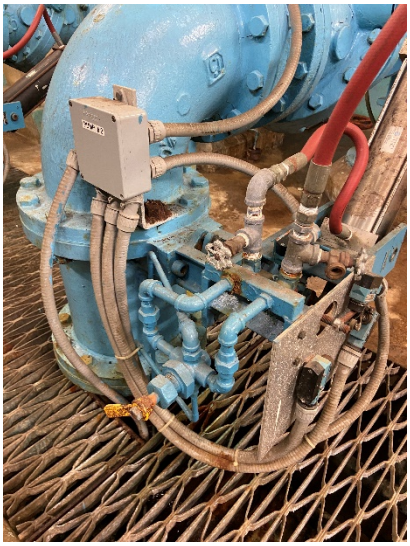

Figure 20: Hydraulic butterfly valve on pump 2

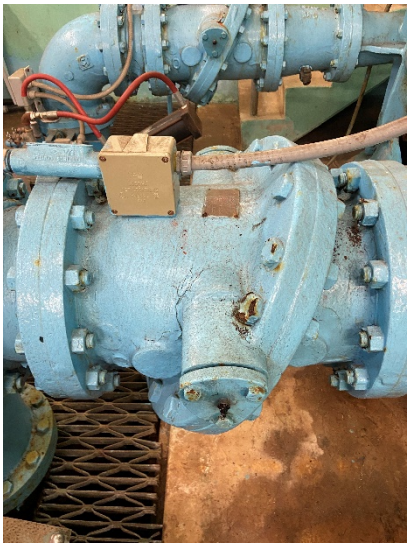

Figure 21: Check valve on pump 2

Figure 22: Label on check valve

Figure 23: Pump 2

Figure 24: Label on pump 2

Figure 25: Check valve on pump 2

Figure 26: Hydraulic butterfly valve on pump 3

Figure 27: New check valve on pump 3

Figure 28: Pump 3

Figure 29: Label on pump 3

Figure 30: Gate valve on pump 3

Figure 31: Pressure gauge

Figure 32: Pump 4

Figure 33: Gate and butterfly valves

Figure 34: Hydraulic butterfly valve on reservoir feed

Figure 35: Label on pump 4

Figure 36: 4" gate valves

Figure 37: Pump 5

Figure 38: 4" gate and check valve

Figure 39: Top view of pump 5

Figure 40: 12" gate valve

Figure 41: Zone 1 feed

Figure 42: Butterfly valve and feed to booster pumps

Figure 43: Pressure gauge (Discharge Pressure)

Figure 44: 8" butterfly valve

Figure 45: 12" gate valve

Figure 46: 4" gate valve

Figure 47: 18" gate valve

Figure 48: 12" gate valve

Figure 49: Pump 4 motor fuel tank

Figure 50: View of station facing northwest

Figure 51: View of station facing north

Figure 52: View of station facing northeast

Figure 53: Label on fuel tank

Figure 54: Butterfly valve controls

Figure 55: Butterfly valve controls

Figure 56: Butterfly valve controls

Figure 57: Sump pump

Figure 58: Pump 3 water trap

Figure 59: Pump 2 water trap

Figure 60: Pump 1 water trap

Figure 61: Pump 1 check valve

Figure 62: Label on check valve

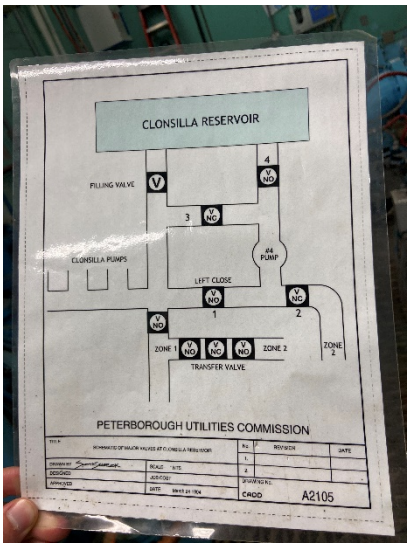

Figure 63: Station schematic

Figure 64: Inside Clonsilla reservoir

Figure 65: Chlorine is fed through the red hose

Figure 66: Another view inside the reservoir

Figure 67: Feed for pumps

Asset Inventory List					
RMOH ID	**Equipment**	**Description**	**Manufacturer**	**Model Number**	**Serial Number**
	Motor	Cummings Diesel Pump			
	Chlorinator	S10K	Wallace and Tiernan	W3T97930	EY18224
	Chlorine Scale	Solo 1000	Force Flow	SR-130-2	FF 24860
	Pump 1	8" SHN-V	Allis-Chalmer		20265
	Pump 2	8" SHN-V	Allis-Chalmer		20266
	Pump 3	No label			
	Pump 4	SG-V	Allis-Chalmer		20267
	Pump 5	TBD			
	Gate Valve	4"	Kennedy		
	Gate Valve	4"	Darling		
	Gate Valve	4"	Darling		
	Gate Valve	5"	Darling		
	Gate Valve	6"	Darling		
	Gate Valve	6"	Darling		
	Gate Valve	10"			
	Gate Valve	10"			
	Gate Valve	12"	Darling		
	Gate Valve	12'	Darling		
	Gate Valve	12"	Kennedy		
R1	Gate Valve	12"	Kennedy		
	Gate Valve	12"		MCABITOY	
	Gate Valve	12"			
	Gate Valve	18"			
	Check Valve	4"			
	Check Valve	6" Suregebuster	Valmatic		
	Check Valve	10"	Dominion		
	Check Valve	10"	Dominion		
	Check Valve	12"	Dominion		
	Butterfly Valve				
	Butterfly Valve	6" with Hydraulic Controls			
	Butterfly Valve	8" with Hydraulic Controls	Rotor		
	Butterfly Valve	10" with Hydraulic Controls			
	Butterfly Valve	10" with Hydraulic Controls			
	Butterfly Valve	10" with Hydraulic Controls			
	Pressure Gauge	N/A	Ashcroft		
	Pressure Gauge	N/A	Ashcroft		
	Pressure Gauge	N/A	Ashcroft		
	Space Heater	N/A			
	Sump Pump	N/A			
	Fuel Tank	680L			

**Missing inventory will be collected during next scheduled inspection*

ASSET MANAGEMENT INSPECTION REPORT

High St Elevated Tank

1170 High St, Peterborough ON

Peterborough Utilities Commission

August 2022

Inspectors: J. Sayles & A. Park

UTILITIES
PETERBOROUGH
COMMISSION

WATER
RIVERVIEW PARK AND ZOO

Peterborough Utilities Commission

1867 Ashburnham Drive, Peterborough, Ontario

Partners in Peterborough Green-Up

Asset Management Inspection Results – 2022

STATION: High St Elevated Tank

ADDRESS: 1170 High St

BUILT: 1957

SERVICE: Zone 1

LATITUDE: 44.29528 degrees

LONGITUDE: 78.3374 degrees

CAPACITY: 4.5 ML

CONTROLS: SCADA

HIGH WATER LEVEL: 252.8 m

LOW WATER LEVEL: 245.2 m

DIAMETER: 29.3 m

BASE ELEVATION: 224 m

OVERALL CONDITION: GOOD

BUILDING AND PROCESS STRUCTURAL – GOOD CONDITION

The High St. Elevated Tank is the oldest water tower in Peterborough. It was constructed in 1957. In 2021 a full rehabilitation was completed to extend the lifespan of the elevated tank. The rehabilitation consisted of interior and exterior coating replacement, interior steel repairs, as well as health and safety upgrades, process pipe replacement and miscellaneous upgrades. The distribution main feeding the tower is a 500mm cast iron pipe. Within the valve house, the main increases to 600mm. The structure appears to be in good condition and no concerns were identified.

BUILDING ARCHITECTURAL – GOOD CONDITION

The water tank is a radial cone bottom/multi leg water tower, constructed by Horton Steel Works. There are several similar water towers in Ontario and the American Midwest. The tank is supported by twelve columns. The City of Peterborough logo is painted in two (2) locations on the outside facing the southwest and northeast. Below the tower, there are three (3) buildings. The valve house contains the electrical and SCADA equipment with access to the distribution main. This building has a brick exterior and a flat roof. The other two (2) buildings house the telecommunication equipment for the antennas attached to the tower and are concrete buildings. The valve house and one (1) of the concrete buildings is surrounded by a chain link fence complete with three (3) strand barbed wire. Immediately to the west is a Hydro One owned property with an electrical substation on it and enclosed in a chain link fence with three (3) strand barbed wire that is connected to a below grade grounding grid. A breaker station on the north side of the property is also owned by Hydro One with the same enclosure arrangement. General Electric properties are immediately east and south. There is a tree line on all sides of the tower except for the west side. There is a gravel driveway leading to the fence that surrounds the tower.

BUILDING SERVICES – GOOD CONDITION

No deficiencies in power supply, heating, or drainage were observed inside the tower. There is sufficient lighting in the electrical room from overhead lights. The main door is locked with a smart key doorknob set. There was no fire extinguisher inside the building. At the time of inspection, all services related to the building appeared to be in good repair.

SITE WORKS – GOOD CONDITION

The High St. water tower is located on High St. just south of Third Ave. There is a chain link fence surrounding the property which is locked with a chain and lock. The surrounding grounds are not sodded. Regular lawn cutting being completed by a third party semi-regularly. The ground below the tank is 19mm clear stone. The property is in good condition.

PROCESS PIPING – GOOD CONDITION

The tower is fed with a 500mm stainless steel piping and is in good condition. A new 500mm gate valve was installed in 2021.

PROCESS MECHANICAL – VERY GOOD CONDITION

There are no pumps or motors in the station. The gate valve and process piping were replaced in 2021 and is in excellent condition.

SCADA GOOD CONDITION

The SCADA monitoring system includes the following:

One (1) Door Alarm
One (1) Aircraft Light Alarm
One (1) Water Elevation Monitor (Level Transducer)
One (1) Commercial Power Alarm
One (1) Cathodic Protection Alarm
One (1) Low Building Temperature Alarm
One (1) Heat/Fire Alarm
One (1) Ultrasonic Loss of Echo
One (1) Emergency Assist Alarm
One (1) Flood Alarm

All SCADA components are in good condition and do not need to be replaced.

PHOTOS

Figure 1: Hydro 1 sub-station

Figure 2: Electrical building

Figure 3: Electrical/SCADA cabinet

Figure 4: Electrical/SCADA equipment

Asset Inventory List			
RMOH ID	**Equipment**	**Description**	**Manufacturer**
ET1	Water Tank	4.5 ML	Horton 1957
	Gate Valve	20" Resilient Seat	American AVK
	Pressure Gauge	N/A	
	Pressure Gauge	N/A	

ASSET MANAGEMENT INSPECTION REPORT

Milroy Elevated Tank

280 Milroy Dr, Peterborough ON

Peterborough Utilities Commission

August 2022

Inspectors: J. Sayles & A. Park

UTILITIES
PETERBOROUGH
COMMISSION

WATER
RIVERVIEW PARK AND ZOO

Asset Management Inspection Results – 2022

STATION: Milroy Elevated Tank

ADDRESS: 280 Milroy Dr

BUILT: 1987

SERVICE: Zone 3N

LATITUDE: 44.33142 degrees

LONGITUDE: 78.34038 degrees

CAPACITY: 0.45 ML

CONTROLS: SCADA

HIGH WATER LEVEL: 317 m

LOW WATER LEVEL: 311.8 m

DIAMETER: 11.9 m

BASE ELEVATION: 275.3 m

OVERALL CONDITION: FAIR

BUILDING AND PROCESS STRUCTURAL – FAIR CONDITION

The Milroy Elevated Tank is a composite water tank and the newest water tower in Peterborough. Since its construction in 1987, no changes have been made to the tower or water tank other than routine maintenance and cleaning. All equipment is above grade at the base of the tower. The inlet/outlet pipe is a 300mm ductile iron watermain. The structure appears to be in fair to good condition and no concerns were identified, however it is expected that the interior of the tank may be exhibiting signs of corrosion. An internal inspection is recommended for the tank to verify condition, but it is anticipated to be fair to poor.

In 2020, a bulk water filling station was added to the property along with a paved entrance, which did not impact the structure of the tower. The equipment for the bulk fill station is located inside an above grade building.

BUILDING ARCHITECTURAL – GOOD CONDITION

The pedestal is constructed of cast in place concrete. Each ring is a metre tall and has a diameter of 6.1 metres. The exterior is an industrial finish. The tank (storage cell) is a steel structure. There is a tree line to the north and west of the tower, which does not interfere with the tower. There is a paved driveway leading to the base of the tower. On the north and east side of the tower, there is electrical equipment, including transformers and communication equipment for the multiple cellular network antennas and satellite dishes (Rogers and Freedom Mobile). The communication antennas are attached to the top portion of the pedestal, below the tank.

The bulk fill station is a pre-engineered building, with steel cladding, a keypad and card reader on the south face of the building for customers. The structure is anchored to a concrete slab foundation.

BUILDING SERVICES – GOOD CONDITION

No deficiencies in power supply, heating, or drainage were observed inside the tower. There is sufficient lighting in the valve room from overhead lights. The main door is secured with a smart key doorknob set. There was no fire extinguisher inside the building. At the time of inspection, all services related to the building appeared to be in good repair.

The bulk fill station building is locked with a smart key doorknob set. An overhead fluorescent bulb provides lighting. A small wall mounted heater provides heat based on a set thermostat.

SITE WORKS – GOOD CONDITION

The Milroy Dr. water tower is located on Milroy Dr. between Chemong Rd. and Rowberry Blvd. There is a chain link fence between the Tower property and the adjacent commercial property to the southeast. The public can access the site via a paved driveway to use the bulk water filling station. The property is landscaped and maintained by a third party vendor.

PROCESS PIPING – VERY GOOD CONDITION

The tower is fed with a 300mm inlet pipe and is in good condition. At the time of the inspection, the insulation around the pipe appeared adequate. The process piping for the bulk fill station is in excellent condition.

PROCESS MECHANICAL – FAIR CONDITION

Inside the valve room there is a sump pump, and it appears to be in good condition. The two (2) butterfly valves are wrapped in insulation. The valves are in fair condition with limited inspection due to insulation. All valves in the bulk fill station are in as new condition.

SCADA – GOOD CONDITION

The SCADA monitoring system includes the following:

Milroy Tower
One (1) Door Alarm
One (1) Water Elevation Monitor (Level Transducer)
One (1) Commercial Power Alarm
One (1) Cathodic Protection Alarm
One (1) Low Building Temperature Alarm
One (1) Flood Alarm
One (1) Heat/Fire Alarm
One (1) Ultrasonic Loss of Echo
One (1) Emergency Assist Alarm
One (1) Aircraft Light Alarm
One (1) Elevation Monitor

Bulk Water Fill Station
One (1) Door Alarm
One (1) Low Building Temperature Alarm
One (1) Flood Alarm
One (1) Heat/Fire Alarm

All SCADA components are in good condition and do not need to be replaced.

PHOTOS

Figure 1: Milroy Elevated Tank

Figure 2: Control Panel in valve room

Figure 3: Two butterfly valves on 12" feed pipe and 6" overflow pipe

Figure 4: Looking up the tower from the inside

Figure 5: 12" feed pipe

Figure 6: Bulk Water Fill Station

Asset Inventory List			
RMOH ID	**Equipment**	**Description**	**Manufacturer**
ET2	Water Tank	0.45 ML	
	Butterfly Valve	12"	Keystone
	Butterfly Valve	6"	Keystone
	Sump Pump	N/A	

ASSET MANAGEMENT INSPECTION REPORT

Sherbrooke Elevated Tank

1560 Sherbrooke St, Peterborough ON

Peterborough Utilities Commission

August 2022

Inspectors: J. Sayles & A. Park

UTILITIES
PETERBOROUGH
COMMISSION

WATER
RIVERVIEW PARK AND ZOO

Peterborough Utilities Commission

1867 Ashburnham Drive, Peterborough, Ontario

Partners in Peterborough Green-Up

Asset Management Inspection Results – 2022

STATION: Sherbrooke Elevated Tank

ADDRESS: 1560 Sherbrooke St.

BUILT: 1984

SERVICE: Zone 3W

LATITUDE: 44.29039 degrees

LONGITUDE: 78.36943 degrees

CAPACITY: 2.72 ML

CONTROLS: SCADA

HIGH WATER LEVEL: 317 m

LOW WATER LEVEL: 304 m

DIAMETER: 17.9 m

BASE ELEVATION: 283 m

OVERALL CONDITION: GOOD

BUILDING AND PROCESS STRUCTURAL – GOOD CONDITION

The Sherbrooke Elevated Tank was constructed in 1984. It is spheroid style water tank. In 2019, a full rehabilitation project was completed including sanding and recoating of the interior and exterior with steel repairs, process piping and miscellaneous upgrades completed at the same time. All equipment is above grade at the base of the tower, and the main inlet/outlet pipe is a 450mm insulated stainless steel pipe replaced in 2019. The structure appears to be in good condition and no concerns were identified.

BUILDING ARCHITECTURAL – GOOD CONDITION

The tower is constructed of steel. At the top of the tower, the City of Peterborough logo is painted on the outside in two (2) locations. There is a tree line to the north of the tower which separates the neighbouring residential property from the tower. There is a gravel driveway leading to the base of the tower. On the northeast side of the tower, there is electrical equipment for Freedom Mobile's Antenna's (mounted on tower) including a transformer, which are enclosed in a chain link fence with barbed wire.

BUILDING SERVICES – GOOD CONDITION

No deficiencies in power supply, heating, or drainage were observed inside the tower. There is sufficient lighting in the valve room from overhead lights. The main door is secured with a smart key doorknob set. There was no fire extinguisher inside the building. At the time of inspection, all services related to the building appeared to be in good repair.

SITE WORKS – GOOD CONDITION

The Sherbrooke St. water tower is located on Sherbrooke St. between Hywood Rd. and Denure Dr. There are no fences surrounding the property for security purposes as it is in a residential area. The surrounding grounds were sodded with regular lawn cutting being completed by a third party. The site appeared to be in good condition. To the west of the site is a Hydro One owned building housing an electrical substation which shares a driveway to the site.

PROCESS PIPING – GOOD CONDITION

The tower is fed with a 450mm stainless steel pipe, which is insulated, and is in good condition. At the time of the inspection, the insulation appeared in good condition.

PROCESS MECHANICAL – GOOD CONDITION

Inside the valve room there is a sump pump, and it appears to be in good condition. The butterfly and gate valve are in good condition.

SCADA – GOOD CONDITION

The SCADA monitoring system includes the following:

One (1) Door Alarm
One (1) Aircraft Light Alarm
One (1) Elevation Monitor (Level Transducer)
One (1) Commercial Power Alarm
One (1) Cathodic Protection Alarm
One (1) Low Building Temperature Alarm
One (1) Flood Alarm
One (1) Heat/Fire Alarm
One (1) Ultrasonic Loss of Echo Alarm
One (1) Emergency Assist Alarm

All SCADA components are in good condition and do not need to be replaced.

PHOTOS

Figure 1: Plaque on the front door of the tower

Figure 2: 16" Butterfly valve

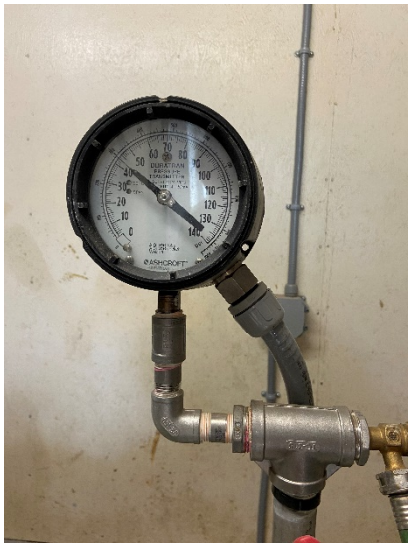

Figure 3: Pressure gauge

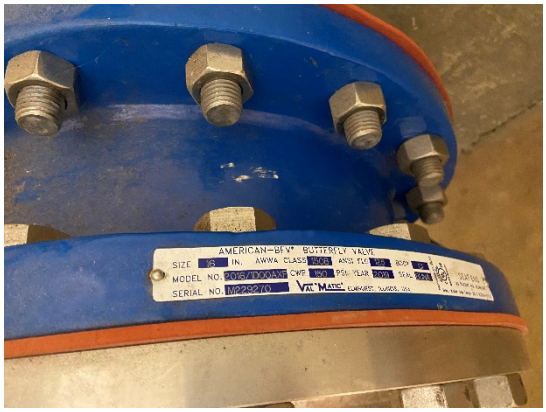

Figure 4: Label on butterfly valve

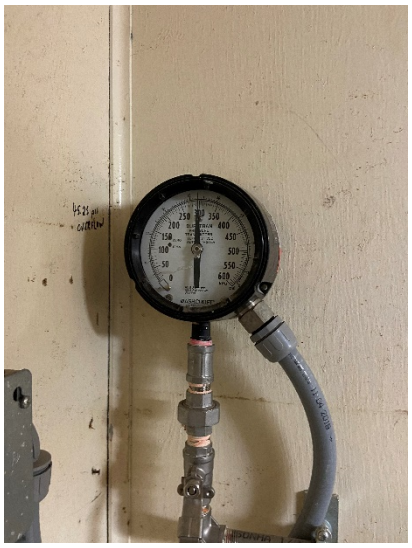

Figure 5: Pressure gauge

Figure 6: 4" gate valve (drain valve)

Figure 7: Electrical box

Figure 8: Electrical cabinet

Figure 9: View looking up tower from inside

Figure 10: Electrical equipment outside (Freedom Mobile)

Asset Inventory List					
RMOH ID	**Equipment**	**Description**	**Manufacturer**	**Model Number**	**Serial Number**
ET3	Water Tank	2.72 ML			
	Gate Valve	4"	Mueller		
	Butterfly Valve	16" Hand Operated	Valmatic	2016/1D00AXF	M229270
	Pressure Gauge	N/A	Ashcroft		
	Pressure Gauge	N/A	Ashcroft		
	Space Heater	N/A			

**Missing inventory data will be collected at the next scheduled inspection*

ASSET MANAGEMENT INSPECTION REPORT

Towerhill Reservoir

679 Towerhill Rd, Peterborough ON

Peterborough Utilities Commission

August 2022

Inspectors: J. Sayles & A. Park

UTILITIES
PETERBOROUGH
COMMISSION

WATER
RIVERVIEW PARK AND ZOO

Peterborough Utilities Commission

1867 Ashburnham Drive, Peterborough, Ontario

Partners in Peterborough Green-Up

Asset Management Inspection Results – 2022

STATION: Towerhill Reservoir

ADDRESS: 679 Towerhill Rd

BUILT: 1971 and 2001

SERVICE: Zone 2

LATITUDE: 44.29039 degrees

LONGITUDE: 78.36943 degrees

CAPACITY: 22.73 ML (Total)

CONTROLS: SCADA

HIGH WATER LEVEL: 288 m

LOW WATER LEVEL: 282 m

CELL 1 DIMENSIONS: 42 x 42 m (1971)

CELL 2 DIMENSIONS: 42 x 62 m (2001)

OVERALL CONDITION: GOOD

BUILDING AND PROCESS STRUCTURAL – GOOD CONDITION

The Towerhill Reservoir is the largest reservoir in Peterborough. It was constructed in 1971 and expanded in 2001. Both cells were built on top of the hill east of Fairbairn St. and South of Towerhill Rd. The equipment for the reservoir is below grade. There are two buildings on the site for access to the reservoir and to house a chlorine tank. The buildings and reservoir are in good condition with no major building and process structural concerns identified.

BUILDING ARCHITECTURAL – GOOD CONDITION

The reservoir is entirely below grade. The ground above the reservoirs is flat and the sod is maintained. The only architectural feature is the brick finish on the building with the chlorine tank, and all other aspects of the facility are industrial. Around the top of the reservoir, there are eight access hatches located at the corners of the tanks. A large vent extends from the tank and is approximately 2m in height. The gravel driveway that leads to the top of the reservoir can accommodate two (2) vehicles for parking. The bricked building has one (1) vent and there is a large vent in the middle on top of the reservoir. The interior of the buildings is clean and does not need cleaning.

BUILDING SERVICES- GOOD CONDITION

No deficiencies in power supply, lighting, drainage, or heating were expected or observed. The reservoir and bricked building are well ventilated, while the building with access to the reservoir does not have any vents. Both buildings have exterior lights that are controlled with a switch, and the doors are secured with a smart key doorknob set. A fire extinguisher is accessible immediately inside of the door. At the time of inspection, all services related to the building appeared to be in good repair.

SITE WORKS – GOOD CONDITION

The Towerhill Reservoir is located on Towerhill Road, just west of Hillview Dr. The area around and on top of the station is sodded with regular lawn cutting being completed by a third-party vendor.

PROCESS PIPING – GOOD CONDITION

All the piping to the station is concrete pressure pipe and is in good condition. No deficiencies were observed at the time of the inspection.

PROCESS MECHANICAL – UNKNOWN (ESTIMATED TO BE FAIR TO GOOD)

The valves and internal piping were not accessible at the time of the inspection.

SCADA – GOOD CONDITION

The SCADA monitoring system includes the following:

Two (2) door alarms
One (1) Elevation Monitor (Level Transducer)
One (1) Commercial Power Alarm
One (1) Low Building Temperature Alarm
One (1) Building Flood Alarm
One (1) Heat/Fire Alarm
One (1) Ultrasonic Loss of Echo Alarm
One (1) Chlorine Residual Monitor
One (1) Old Cell Hatch Alarm
One (1) New Cell Hatch Alarm
One (1) Loss of Phase Alarm
One (1) Emergency Assist Alarm

All SCADA components are in good condition and do not need to be replaced.

PHOTOS

Figure 1: Chlorine tank in bricked building

Figure 2: View of station from northwest corner facing south

Figure 3: View of station from middle vent facing west

Figure 4: View of station from middle vent facing southwest

Figure 5: View of station from middle vent facing southeast

Figure 6: View of station from middle vent facing northeast

Figure 7: Two buildings at the Towerhill reservoir

Figure 8: Electrical equipment in white building

Figure 9: Electrical cabinet

Figure 10: View of white building with middle vent to the left

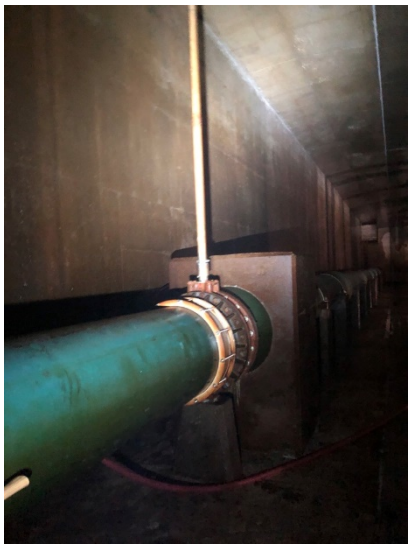

Figure 11: Inline pipe inside reservoir

Figure 12: Inside towerhill reservoir

Figure 13: Support pole in reservoir

Figure 14: Corner of reservoir

Figure 15: Another view of feed pipe

Figure 16: Panoramic photo of station from southeast corner

Figure 17: Panoramic photo of view from the top of the reservoir

Water Distribution System Condition Rating Analysis Flow Chart

Date: March 9th 2004
Prepared by P. Newman
Approved by K. G. Murphy

Definitions of Terms

CIC	Customer Interruption Criteria*
ESL	Expected Service Life (100 years)
LSCI	Link Specific Customer Impact
LFT	Link Failure Trend
WLA	Water Main Link Age

*CIC = Sum of (# of customers affected by a break X # of outage hours) within a 15 year period for each link

Check Link Replacement Criteria

Replacement Flags

Check Link Failure Trend **Flag if LFT > 0**

OR

Compare Link Age to Expected Service Life **Flag if WLA > ESL (100 years)**

Check Material Type **Flag if Hypertech, Fibre Reinforced Cement or Asbestos Cement**

Replacement flags?

YES

Prioritize Link Replacement

Age

80+	4
51-80	3
21-50	1

Customer Interruption Criteria

CIC > 500	5
200 < CIC <= 500	3
60 < CIC <=200	1

Corrosion Protection

No Protection on Cast Iron or Ductile Iron 2

Link Failure Trend

Slope of break graph best fit line is

LFT > 0.01	5
0.005 < LFT <= 0.01	3
0 < LFT<= 0.005	1

Material Type

Hypertech	3
Asbestos Cement	1
Fibre Reinforced Concrete	3

Generate **Long Range Water Main Replacement Report**

NO

Check Link Rehabilitation Criteria

Rehabilitation Flags

Check lining and Material Type **Flag if unlined Cast Iron or Ductile Iron**

AND

Size **Flag if Size > 125**

Rehabilitation flags?

YES

Prioritize Link Rehabilitation

Age as related to C-Factor

60+	5
35-59	3
20-34	1

Size

150-200	3
250-300	2
350+	1

Lining

Link is unlined Cast Iron or Ductile Iron 3

Water Quality Complaints

Future Considerations

Link Water Quality Complaint Trend

Generate **Long Range Water Main Rehabilitation Report**

PETERBOROUGH UTILITIES COMMISSION

1867 Ashburnham Drive, PO Box 4125, Station Main
Peterborough ON K9J 6Z5

WATER SYSTEM FINANCIAL PLAN

Prepared in accordance with the Safe Drinking Water Act

And

Ontario Regulation 453/07

PETERBOROUGH UTILITIES COMMISSION

DRINKING WATER SUPPLY SYSTEM

2019 – 2028 FINANCIAL PLAN

LICENCE # 145-101

Peterborough Utilities Commission endorsed and approved the Water Financial Plan for submission to the Ministry of Municipal Affairs and Housing on March 25, 2021.

OVERVIEW

The Peterborough Utilities Commission ("PUC"), per the Municipal Act 2001, operates as a municipal services board of the City of Peterborough. The PUC is governed by a 5 member Commission comprised of the Mayor of the City of Peterborough and 4 elected council members.

The PUC is responsible for providing Peterborough residents and businesses with a safe, clean and reliable supply of water. Peterborough has a plentiful supply of source water from the Otonabee River. This water is treated in a government-inspected facility before being distributed throughout the City. Each year the external and PUC labs test thousands of water samples to ensure that Peterborough's drinking water is safe and aesthetically pleasing. About twenty thousand tests are conducted each year to ensure the drinking water surpasses health-related standards.

The PUC must maintain and continually improve its infrastructure to ensure that its systems are capable of delivering safe, affordable and quality water to the residents of Peterborough for now and into the future and operates on a full cost recovery system.

BACKGROUND

The Ministry of the Environment Conservation and Parks introduced a new Municipal Drinking Water Licensing Program under the Safe Drinking Water Act ("SDWA") 2002 as a result of a recommendation by Justice O'Connor's Part II Report of the Walkerton Inquiry. Having met all the necessary initial filing requirements, the PUC was issued its Municipal Drinking Water License on April 15, 2016. Once received, this license is valid for 5 years provided the owner:

- Maintains its status as an accredited operating authority;
- Prepares a financial plan and has it approved by owner;
- Has a valid permit to take water; and
- Operated the drinking water system according to the conditions in the license.

As the PUC has met each of the above criteria, its license is set to expire April 14, 2021, the end of the 5-year period. An application for renewal will need to be submitted by the PUC, and the Director will issue PUC a license renewal if the Director is satisfied that the following criteria are all met:

1. The system will continue to be operated by an accredited operating authority;
2. The Drinking Water Works Permit remains in force
3. Operation plans for the system satisfy the requirements of the Directors' Directions for Operational Plans;
4. Financial plans have been prepared and approved;
5. The system has been and will continue to be operated in accordance with the requirements under the SDWA and the license; and
6. Any required permits to take water remain in force (if required).

This financial plan has been prepared to satisfy the above item number 4. Ontario Regulation 453/07 of the SDWA requires the owners of a drinking water system to submit their financial plans to the Ministry of Municipal Affairs and Housing for licensing. Per the regulations, the financial plan must;

- Be approved by Council resolution (or governing body, Commission);
- Apply for a period of at least six years, the first of which must be the year in which the drinking water system's existing municipal drinking water license would otherwise expire;
- Provide projected financial statements including a statement of financial position, statement of financial operations and statement of cash flows;
- Be available to the public without charge and available on the PUC website.

SUSTAINABLE FINANCIAL PLANNING

Achieving financial sustainability in Ontario's municipal water and wastewater sector is a long-term provincial goal. The overall guiding principle in the development of this Financial Plan is to ensure that both current operating needs and longer-term infrastructure renewal planning are addressed.

The SDWA requires a declaration of the financial plan's sustainability but it does not give a clear definition of what would be considered sustainable. The Ministry of the Environment released a guideline entitled "Towards Financially Sustainable Drinking-Water and Wastewater Systems" that provides principles for achieving sustainability, to assist owners in preparing the Financial Plan. Listed below are nine principles developed by the Ministry which the PUC has reviewed in preparing its Water System Financial Plan.

Principle #1: Ongoing public engagement and transparency can build support for, and confidence in, financial plans and the system(s) to which they relate.

Principle #2: An integrated approach to planning among water, wastewater, and storm water systems is desirable given the inherent relationship among these services.

Principle #3: Revenues collected for the provision of water and wastewater services should ultimately be used to meet the needs of those services.

Principle #4: Life-cycle planning with mid-course corrections is preferable to planning over the short-term, or not planning at all.

Principle #5: An asset management plan is a key input to the development of a financial plan.

Principle #6: A sustainable level of revenue allows for reliable service that meets or exceeds environmental protection standards, while providing sufficient resources for future rehabilitation and replacement needs.

Principle #7: Ensuring users pay for the services they are provided leads to equitable outcomes and can improve conservation. In general, metering and the use of rates can help ensure users pay for services received.

Principle #8: Financial Plans are “living” documents that require continuous improvement. Comparing the accuracy of financial projections with actual results can lead to improved planning in the future.

Principle #9: Financial plans benefit from the close collaboration of various groups, including engineers, accountants, auditors, utility staff, and municipal council.

FINANCIAL PLAN

In accordance with the Ministry of Environment, Conservation and Parks requirements, and the principles listed above, the PUC has prepared the required financial statements which are attached to this report. These financial statements have not been audited and comprise 2019 actual results, 2020 projected results and 2021 to 2028 forecasted results.

The 2019 figures are a summarized version of the audited financial statements. The 2020 projected results are management’s best projection the year end results, the audit of which has yet to be finalized. The future year assumptions originate from the ten-year financial model maintained by the PUC that integrates data from the PUC asset management plan to forecast capital and operating costs and identify sources of funding to ensure long-term financial viability. These financial plans are living documents that are continuously updated based on actual results and managements best estimates for the future.

The attached financial statements include a statement of financial position, statement of operations and accumulated surplus, and statement of cash flow. The following summarizes key information from the forecasted financial statements presented.

Statement of Financial Position

The Statement of Financial Position describes the financial assets, liabilities, non-financial assets and accumulated surplus of the PUC.

Net Financial Assets

The attached Statement of Financial Position indicates that the net financial assets are forecast to be $8.06 million at December 31, 2020, decreasing to $5.74 million in 2028. Total cash is expected to decrease from $23.50 million at December 31, 2020 to $18.38 million at December 31, 2028 as the PUC has a net repayment of $4.29 million in debenture financing over that period.

Total Non-Financial Assets

Total Non-Financial Assets are expected to increase by $25.54 million from $119.94 million as of December 31, 2020 to $146.00 million at December 31, 2028. The increase is the result of the additions in the PUC's tangible capital assets ("TCA"). The PUC's planned capital additions for the years 2021 to 2028 total $81.40 million which is reduced by amortization of $55.33 million resulting in the net increase in TCA of $26.07 million.

Accumulated Surplus

The PUC Accumulated Surplus in expected to increase by $23.75 million from the December 31, 2020 forecasted amount of $128.00 million to a December 31, 2028 forecast amount of $151.75 million

Statement of Operations and Accumulated Surplus

The Statement of Operations summarizes the PUC revenues and expenses for a specific period. The Annual Surplus measures whether the revenues generated were sufficient to cover operating expenses incurred, including the ability to fund the interest payments on debentures. The Annual Surplus is expected to fluctuate throughout the Financial Plan, starting at $2.77 million for the year ending December 31, 2021 and increasing to $3.62 million by December 31, 2028, with a low of $2.05 forecast for 2023. It is important to note that the annual surplus is beneficial to ensure funding is available to non-expense costs, such as TCA additions and debt principal repayments.

Statement of Cash Flow

The Statement of Cash Flow summarizes changes in cash resulting from operations and indicates how the PUC financed its activities. In simple terms it is a summary of how the PUC generates and used its cash resources during a specific period.

Cash Provided by/(Used in) Operation

The PUC is expected to generate cash from operations in the amount of $72.49 million from 2020 to 2028. The amount is comprised of cash generated from annual surplus of $25.21 million net of amortization, a non-cash expenditure, of $61.53 million. These amounts are reduced by revenue maintained in reserve funds and changes in non-cash working capital of $14.25 million.

Investing Activity

During the period 2020 to 2028 the PUC has planned capital expenditures of $84.88 million. The PUC capital program is driven by the PUC's asset management plan ("AMP") that is based upon an internally developed Linear Asset Management Plan ("LAMP") and a Long Term Water Utility Master Plan provided by an outside consultant in 2019. This plan is reviewed and updated annually based on both current year activity and projected future needs.

Financing Activities

During the 2020 to 2028 planning period the PUC Financial Plan includes $6 million in new debentures that were taken in 2020, and an additional $6 million forecast to be drawn in 2023.

The PUC has been able to manage an extensive capital program while incurring minimal debt, and at the same time managing moderate rate changes to avoid extreme fluctuations. Long-term borrowing is confined to capital improvements or similar projects with an extended life when it is not practical to be financed from current revenues. Financing does not extend beyond the estimated useful life of the projects being financed and is typically limited to 20 years.

Cash Position

Unrestricted cash is anticipated to decrease from a December 31, 2020 projected balance of $13.34 million to $10.09 million as at December 31, 2028. The December 31, 2028 balance provides a reasonable working capital reserve and therefore there are no cash flow concerns for the PUC.

In addition to the unrestricted cash, PUC also maintains restricted cash accounts maintained for large capital projects. Amounts in the restricted account are projected to decrease from $10.17 million forecast for December 31, 2020 to $8.28 million in 2028 with restricted funds expected to be utilized in 2022-2024 to fund significant capital projects.

SUMMARY

The PUC is well prepared to be able to meet the challenges ahead and continue delivering safe, affordable and quality water to the residents of Peterborough for now and into the future. Operating under a full cost recovery system, the financial plan utilizes long-term planning in developing an understanding of the City of Peterborough's infrastructure needs and creating a financial structure that ensures resources are used in an efficient and effective manner. The PUC recognizes that the integrity of its finances is critical to the successful operation of the Utility and to its reputation and trust by ratepayers.

The Financial Plan has been prepared using the most accurate financial and technical information available at the time of publication. Actual results could differ from these estimates, the materiality if which is undeterminable at this time.

PETERBOROUGH UTILITIES COMMISSION
Statement of Financial Position
($'s in thousands)

	2019 Actual	2020 Forecast	2021 Budget	2022 Budget	2023 Budget	2024 Budget	2025 Budget	2026 Budget	2027 Budget	2028 Budget
Financial Assets										
Cash	5,650	13,335	8,907	6,453	12,819	15,610	15,395	11,310	10,737	10,093
Restricted Cash	9,459	10,161	11,017	7,947	4,909	3,882	4,902	5,971	7,095	8,283
Accounts receiable	4,808	5,077	5,450	5,505	5,560	5,615	5,671	5,728	5,785	5,843
	19,917	28,573	25,374	19,904	23,288	25,107	25,968	23,010	23,618	24,219
Liabilities										
Accounts payable and deposits	6,608	6,295	6,950	7,159	7,373	7,594	7,822	8,057	8,299	8,548
Debentures	9,605	14,216	12,914	11,598	16,268	14,922	13,561	12,183	10,789	9,930
	16,213	20,511	19,864	18,757	23,641	22,516	21,383	20,240	19,088	18,478
Net financial assets	3,704	8,062	5,510	1,148	(353)	2,590	4,585	2,770	4,530	5,741
Non-financial assets										
Tangible capital assets	122,125	119,409	124,728	131,508	135,059	135,197	135,529	140,964	143,077	145,479
Inventory	423	530	530	530	530	530	530	530	530	530
Prepaid expenses	291	-	-	-	-	-	-	-	-	-
	122,839	119,939	125,258	132,038	135,589	135,727	136,059	141,494	143,607	146,009
Accumulated Surplus	126,543	128,001	130,768	133,186	135,236	138,317	140,644	144,264	148,137	151,750

PETERBOROUGH UTILITIES COMMISSION
Statement of Operations and Accumulated Surplus
($'s in thousands)

	2019 Actual	2020 Forecast	2021 Budget	2022 Budget	2023 Budget	2024 Budget	2025 Budget	2026 Budget	2027 Budget	2028 Budget
Revenues										
Sale of water	17,539	18,121	18,321	18,999	19,786	20,437	21,176	21,940	22,785	23,853
Other	2,891	2,002	3,840	3,491	2,971	4,097	3,007	4,088	4,107	3,328
Total revenues	20,430	20,123	22,161	22,490	22,757	24,534	24,183	26,028	26,892	27,181
Expenses										
Operating	8,735	8,422	8,679	8,939	9,208	9,484	9,768	10,061	10,363	10,674
Administrative	3,824	3,769	4,018	4,139	4,263	4,391	4,522	4,658	4,798	4,942
Interest	326	277	417	424	401	648	624	599	574	553
Amortization	6,185	6,197	6,280	6,570	6,835	6,930	6,942	7,090	7,283	7,399
Total expenses	19,070	18,665	19,394	20,072	20,707	21,452	21,856	22,408	23,018	23,568
Annual Suprlus	1,360	1,458	2,767	2,417	2,050	3,082	2,327	3,620	3,874	3,613
Opening Accumulated Surplus	125,183	126,543	128,001	130,768	133,186	135,236	138,317	140,644	144,264	148,137
Closing Accumulated Surplus	126,543	128,001	130,768	133,186	135,236	138,317	140,644	144,264	148,137	151,750

PETERBOROUGH UTILITIES COMMISSION
Statement of Cash Flow
($'s in thousands)

	2019 Actual	2020 Forecast	2021 Budget	2022 Budget	2023 Budget	2024 Budget	2025 Budget	2026 Budget	2027 Budget	2028 Budget
Cash provided by (used in) Operations										
Annual Surplus	1,360	1,458	2,767	2,417	2,050	3,082	2,327	3,620	3,874	3,613
Add: Non cash charges										
Amoritzation	6,185	6,197	6,280	6,570	6,835	6,930	6,942	7,090	7,283	7,399
Less: Reserve fund revenue in surplus	(1,165)	(981)	(2,293)	(1,618)	(1,062)	(2,180)	(1,120)	(2,233)	(2,287)	(1,553)
	6,380	6,674	6,754	7,369	7,823	7,831	8,148	8,476	8,870	9,459
Changes in non-cash working capital	(22)	(398)	282	154	160	166	172	178	184	191
	6,358	6,276	7,036	7,523	7,983	7,997	8,320	8,654	9,055	9,650
Investing Activity										
Net additions to tangible capital assets	(6,730)	(3,481)	(11,599)	(13,350)	(10,386)	(7,068)	(7,273)	(12,525)	(9,397)	(9,801)
Fiancing Activities										
Proceeds from debenture debt	-	6,000	-	-	6,000	-	-	-	-	-
Debenture repayment	(1,376)	(1,389)	(1,302)	(1,316)	(1,331)	(1,346)	(1,361)	(1,377)	(1,394)	(859)
Transfer from reserves	219	279	1,437	4,688	4,100	3,208	100	1,163	1,163	365
	(1,157)	4,890	135	3,372	8,769	1,862	(1,261)	(214)	(231)	(494)
Net change in unrestricted cash for the year	(1,529)	7,685	(4,428)	(2,454)	6,366	2,791	(214)	(4,085)	(573)	(644)
Cash position, beginning of year	7,179	5,650	13,335	8,907	6,453	12,819	15,610	15,395	11,310	10,737
Cash position, end of year	5,650	13,335	8,907	6,453	12,819	15,610	15,395	11,310	10,737	10,093

Assessment of Drinking Water System (Quality Perspective)

					Risk Assessment				Control Measure			Consideratio	
	Category	Sub-Process (where applicable)	Potential Hazard (potential for causing harm)	Associated Water Quality Hazards	Likelihood	Impact	Level of Risk	Critical Control Point	Emergency (contingency)	Operational (Procedural)	CCP Measurable (Yes/No)	Considered Long Term Impact Climate Control	Comments
1	**Source Water**		Flood	High turbidity, physical impact on Water Street P/H and dam,	D	1	low		X		-	X	
2	**Source Water**		Severe changes in turbidity	Effects on treatment process of sedimentation and filtration	D	2	low			X	Y	X	75 NTU historical high
3	**Source Water**		Bacteria, viruses, etc.	Increased concentrations of bacteria, viruses etc. place more importance on the water treatment process (includes significant concentration of water fowl upstream of intake)	B	1	moderate			X	Y	X	Waterfowl Management
4	**Source Water**		Pesticides, herbicides (MCPP)	Chemical could impact treatment train, treatment not designed to remove chemicals and the chemical would be transferred to finished water and result in health concern	D	3	moderate			X	Y	X	Quarterly Testing, follow Adverse Water Results Procedure
5	**Source Water**		Aquacides (diaquat)	Chemical could impact treatment train, treatment not designed to remove chemicals and the chemical would be transferred to finished water and result in health concern	D	3	moderate			X		X	MOE to notify us if Permit has been issued
6	**Source Water**		Metals	Metals could impact treatment train, treatment not designed to remove metals and the metal would be transferred to finished water	E	3	moderate			X	Y	X	
7	**Source Water**		Chemical spill into river	Chemical could impact treatment train, treatment not designed to remove chemicals and the chemical would be transferred to finished water and result in health concern	D	3	moderate			X		X	
8	**Source Water**		Pharmaceutical Residuals	Chemical could impact treatment train, treatment not designed to remove chemicals and the chemical would be transferred to finished water and result in health concern	E	2	low					X	
9	**Source Water**		Sewage spill into river	Bacteriological effects on raw water could impact the water treatment effectiveness and result in a health concern	C	1	low		X			X	
10	**Source Water**		Cyanobacteria	Natural occurring formation of cyanotoxins in stagnant water could result in a health concern when Microcystin-LR concentrations reach 1.5 ug/L in the treated water. Microcystin-LR is a common algal toxin. that can be produced from decaying Cyanobacteria.	D	3	moderate					X	SOP-02-120 Harmful Algal Bloom Monitoring
11	**Source Water**		Failure of alarms and monitoring equipment	Loss of operator control at the facility	C	1	low			X		X	
12	**Source Water**		Zebra Mussels	Taste and odour can be found in the treated water due to the decomposition of the zebra mussels.	B	1	Moderate			X		X	pre-chlorination option
13	**Source Water**		Road salt	Reportable to Ministry of Health is above 200 mg/L	A	1	moderate			X		X	previous results do not show a increase in 5 year trend
14	**Treatment**	Finished water chemical addition	Fluoride overdose	Fluoride is a strong acid and an overdose could result in health concerns	E	3	moderate			X		X	
15	**Treatment**	Coagulation / Flocculation / Sedimentation	Loss of coagulant	Coagulant assists the sedimentation process which is a major barrier in the removal of giardia, cryptosporidium, etc.	D	4	**High**	CCP			Yes	X	SOP-02-112

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16	**Treatment**	Coagulation / Flocculation / Sedimentation	Inadequate Coagulation / flocculation	Coagulant and flocculation (slow mixing) assists the sedimentation process which is a major barrier in the removal of giardia, cryptosporidium, etc.	E	2	low			X		X	
17	**Treatment**	Coagulation / Flocculation / Sedimentation	Sedimentation failure	Sedimentation process which is a major barrier in the removal of giardia, cryptosporidium, etc.	E	2	low			X		X	
18	**Treatment**	Filtration	Filter breakthrough	Filter short-circuiting resulting in increased health concerns	D	2	low			X		X	
19	**Treatment**	Primary Disinfection	Primary disinfection failure	No disinfection of the drinking water resulting in an acute health concern	D	4	**high**	CCP			Yes	X	SOP-02-111
20	**Treatment**	Primary Disinfection	Primary disinfection overdose	Primarily an aesthetic concern unless overdose is severe, which could result in health concerns.	D	3	moderate			X		X	
21	**Treatment**	Secondary Disinfection	Secondary disinfection failure	Loss of a health-protection barrier for the distribution system which would result in an increased health concern	D	4	**high**	CCP			Yes	X	Pre-chlorination option SOP-02-109
22	**Treatment**	Secondary Disinfection	Secondary disinfection overdose	Primarily an aesthetic concern unless overdose is severe, which could result in health concerns.	D	3	moderate			X		X	
23	**Treatment**		Chemical supply contamination	Contaminated chemical could further contaminate the drinking water and create health concerns	E	4	**high**	CCP			Yes	X	SOP-02-113
24	**Treatment**		High filter turbidity	Indicates potential failure of filtration barrier, resulting in increased health concerns	D	4	**high**	CCP			Yes	X	SOP-02-110
25	**Treatment**		Vandalism / terrorism	Vandals could impact water quality in the facility, causing increased health concerns	E	5	high		X		No	X	
26	**Treatment**		Failure of SCADA alarms	Loss of operator control at the facility, potential to lose water quality data	C	2	moderate			X		X	
27	**Treatment**		Loss of monitoring equipment	increase turbidity	E	2	low			X		X	
28	**Chemical Storage**		leak of chemical storage, loss of supply of chemical	Loss of critical chemical use for water treatment	D	2	low		X			X	SOP-02-112 SOP-02-111
29	**Chemical Storage**		Secondary Chlorine containment @ Clonsilla	Loss of water storage capacity	D	3	moderate			X		X	
30	**Water Storage**		Vandalism / terrorism	Vandals could impact water quality in the facility, causing increased health concerns	E	4	high		X		No	X	Hatch and door alarms linked to SCADA
31	**Water Storage**		Pathogenic Contamination	decreased water quality from accidental animal waste or carcass	D	2	low					X	
32	**Water Storage**		Biofilm growth	Depletion of free chlorine residual	D	1	low			X		X	
33	**Water Storage**		Low chlorine residual	Secondary disinfection barrier absent	D	2	low			X		X	SCADA Monitored, see secondary disinfection SOP
34	**Water Storage**		Water residency time	Reduction in free chlorine residual	C	1	low			X		X	
35	**Water Storage**		Failure of alarms and monitoring equipment	Loss of operator control at the facility	C	1	low			X		X	Redundancy SCADA Monitored
36	**Pumping Facilities**		Power Failure	Extended power failures may result in lower distribution system pressures	C	1	low		X			X	Diesel Generators
37	**Pumping Facilities**		Vandalism / terrorism	Vandals could impact water quality in the facility, causing increased health concerns	E	1	low		X			X	Hatch and door alarms linked to SCADA

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38	**Pumping Facilities**		Failure of alarms and monitoring equipment	Loss of operator control at the facility	C	1	low			X		X	Redundancy SCADA Monitored
39	**Pumping Facilities**		Catastrophic pumping facility failure	Loss of station could impact overall system pressure	E	3	moderate			X		X	redundancy in system
40	**Chlorine Booster**		Vandalism / terrorism	Vandals could impact water quality in the facility, causing increased health concerns	E	2	low		X			X	
41	**Chlorine Booster**	Clonsilla Reservoir	Power failure	If generator fails, loss of booster chlorination possibly resulting in lower free chlorine residuals in the distribution system	C	1	low		X			X	diesel pump, ability to by pass solenoid to work around power outage
42	**Chlorine Booster**		Chlorination failure	Lower free chlorine residuals in the distribution system	C	2	moderate			X		X	
43	**Chlorine Booster**		Chlorine overdose	Primarily an aesthetic concern unless overdose is severe, which could result in health concerns.	C	2	moderate			X		X	SCADA Monitored
44	**Chlorine Booster**		Failure of alarms and monitoring equipment	Loss of operator control at the facility	C	1	low			X		X	Redundancy SCADA Monitored
45	**Distribution**		Water main break causing contamination		D	2	low			X		X	O & M Manual, no Cat 2(with notification) breaks in 2019 WD staff trained for new WM disifection procedure
46	**Distribution**		Backflow from private plumbing - major industry		D	3	moderate					X	Existing Cross Connection Control Program
47	**Distribution**		Vandalism / terrorism	Vandals could impact water quality in the distribution system, causing increased health concerns	E	4	high		X		No	X	
48	**Distribution**		Low pressure	Backflow conditions may occur resulting in potential health concerns	C	2	moderate			X		X	O & M Manual
49	**Distribution**		Rehabilitation, replacement and commissioning new new mains causing contamination	high dose of chlorine could result in skin and stomach irritation	E	2	low			X		X	SOP-09-002
50	**Distribution**		Aged pipes / infrastructure	Reduction of free chlorine residual, degradation of water quality and reliability of service	B	1	moderate			X		X	Capital 5 year plan
51	**Distribution**		Biofilms	Will reduce available secondary free chlorine and may harbour other bacteria and provide less effective disinfection	D	1	low			X		X	
52	**Distribution**		Formation of DBP's above MAC		D	3	moderate			X		X	Quarterly Testing Standard
53	**Distribution**		Failure of alarms and monitoring equipment	Loss of operator monitoring capability	D	1	low			X		X	Redundancy SCADA Monitored
54	**Distribution**		Long residency water	Lower free chlorine residuals in the distribution system		1	low			X		X	O & M Manual
55	**Distribution**		Contaminated water	Increased concentrations of bacteria, viruses etc. decreased water quality	D	3	moderate			X		X	O & M Manual
56	**Distribution**		Temporary overland by-pass	damage to by-pass could result in contamination of water	C	2	moderate			X		X	Operational Control, Back flow device testing required by Engineering
57	**Distribution**		Dead End	low free chlorine residual in system leading to increase adverse water quality	B	2	**high**	CCP		X		X	systems to include loop, install bleeders lines

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58	**Distribution**		Contaminated water from unauthorized hydrant use	high turbidity water quality complaints	C	2	moderate	no		X		X	Corporate procedure, customer complaint and Contractor education
59	**Distribution**	Reservoir and elevated tanks		Maintenance at facility, long term outage could increase vulnerability of system, in high use periods	D	2	Minor			X	no	X	Operational redundancy
60	**Additional MECP**		Extreme Weather events, (storms or ice storm)	power outage, communication issued, disruption to normal working conditions	D	2	Low	No	X		no	X	This is a quantity issue not quality
61	**Additional MECP**		Sustained extreme temperature (heat wave, deep freeze)	potential increase water main freeze/break loss of water						X	No	X	