



Annual Drinking Water Report 2020





2020 Annual Drinking Water Report

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2020 Peterborough Utilities Commission

Mayor Diane Therrien..... Chair
Councillor Don Vassiliadis..... Vice-Chair
Councillor Gary Baldwin Commissioner
Councillor Dean Pappas..... Commissioner
Councillor Stephen Wright..... Commissioner

2020 Riverview Park and Zoo Advisory Committee

Name of Volunteer	Date Appointed
Wally Davidson	Lifetime Member
Janet Lafortune	January 2018
Paul Hartung	January 2018
Shauna Moodie	January 2020
Susan Ramey	January 2020

On the Cover

During 2020 a new Signal Tower was constructed for the miniature train ride located at the Riverview Park and Zoo.

Questions or comments

Please contact us either by mail, phone or email.

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Introduction

All Peterborough Utilities Commission facilities are managed and operated under contract by PUG Services Corp. (PUGSC). The Water Utility section of PUGSC includes the following operating departments:

- Water Treatment Plant
- Water Distribution
- Water Engineering Services
- Riverview Park and Zoo

Drinking Water Process Description

Source Water

The source of raw (untreated) water for Peterborough's drinking water is the Otonabee River. The Otonabee River water is of good quality and can be described as a moderately coloured water of low turbidity. The river water temperature ranges from 0°C (winter) to approximately 26°C (summer). The raw river water is what we call a surface water supply, which means that it is considered to be an unprotected source.

Accordingly, we assume that raw water always requires full treatment at the Peterborough Water Treatment Plant to make it drinkable or potable.

The river water quality is monitored by staff at the plant as well as the Otonabee Region Conservation Authority (ORCA) and the Peterborough Health Unit (beaches only).

The watershed is protected by planning and approvals processes through the City of Peterborough and ORCA. Since 1998, ORCA has monitored water quality in the Otonabee watershed under the Watershed 2000 Program and the Provincial Water Quality Monitoring Network.

Peterborough Utilities continued its participation in the Source Water Protection Committee in 2020.

Treatment Plant Operations

The plant is located at 1230 Water Street North, Peterborough, adjacent to the Riverview Park & Zoo. The plant was initially built in 1922 and expanded in 1952, 1965, 1995 and 2016. The conventional treatment process includes coagulation, flocculation, sedimentation, filtration and chlorine disinfection and a process waste treatment facility to dewater the backwash sludge.

Total raw water processed in 2020 was 11,116.32 megalitres (ML), this is an average of 30.46 ML daily (Table 1). The maximum daily pumpage of 38.31 ML, occurred on July 7th, was a 2% decrease from the maximum daily value (40.07 ML) recorded on August 2nd, 2019.



Table 1

Water Treatment Plant Operations	2019	2020
Total Annual Raw Water	11,037.65	11,116.32
Average Day ML	30.24	30.46
Total Annual Plant Effluent	9,741.72	9,707.10
Average Day ML	26.68	26.51
Max. Daily Pumpage	40.07 – Aug 2	38.32 – Jul 7
Max. Daily City Consumption	38.48 – Aug 2	37.64 – Jul 7
Peak Hourly Consumption Rate	70.09– May 14 @ 15:30h	74.78– Aug 26 @ 15:30h
Total Wash Water	238.81	247.81
Average of Plant Effluent	2.5 %	2.5 %
Total Zone #1 Pumpage	5,706.92	5,828.22
Average Day	15.63	15.93
Total Zone #2 Pumpage	4,034.80	3,878.89
Average Day	11.05	10.59

Reservoirs, Elevated Tanks, Water Booster Pumping Stations

Treated water is stored at various locations throughout the City in underground reservoirs and elevated storage tanks. Storage is used to supplement supply during times of high water demand and in emergency situations such as firefighting. The water storage capacity in the system is 55.36 ML, including the Water Treatment Plant. Water storage around the city is as follows:

Water Treatment Plant	8.5 ML
High Street Elevated Tank	4.55 ML
Clonsilla Avenue Reservoir	18.18 ML
Towerhill Reservoir	22.73 ML
Sherbrooke Elevated Tank	2.3 ML
Milroy Elevated Tank	0.5 ML

Water Distribution

The water distribution system consists of approximately 469 kilometres of pipe (water mains), 2,394 hydrants and 27,323 individual water services. Hydrants are colour-coded according to the Ontario Fire Code requirements to indicate the available flow rate at a 20 psi residual pressure.



PTBO H₂O

The Utilities' mobile drinking water station, named PTBO H₂O did not operate in 2020 due to the COVID-19 pandemic.

Capital Works Summary

The Water Treatment Plant underwent the following upgrades in 2020

- ◆ SCADA software was replaced to comply with Windows 10 upgrades
- ◆ Granular activated carbon caps were installed on filter #10 and #11 to assist in the reduction of THM and HAA's
- ◆ 32, 000 litre wood stave tank was installed to store Sodium Hydroxide which is used for pH adjustment.

New Bulk Water Station

Peterborough Utilities Commission has installed a new Bulk Water Fill Station at 280 Milroy Drive to replace the existing station located at 1867 Ashburnham Drive. The new station offers both an overhead and a side fill options. In addition, a large cul-de-sac has been constructed to increase vehicular safety while using the station.



Water Main Replacement

Approximately 414 m of distribution water mains were replaced on:

- ◆ Moorecraig Road
- ◆ Roper Drive

New Water Main Installation

Approximately 121 m of water main was installed to eliminate dead ends on:

- ◆ Tivey Street
- ◆ Townsend Street

Water Service Replacement

A total of 98 water services were repaired and 28 water services were replaced in 2020.

Water Main Rehabilitation

The 2020 water main rehabilitation contracts were placed on hold due to COVID-19.

Summary of Inspection & Compliance

Ministry of Environment Conservation & Parks Inspection

During 2020, there was a Ministry of the Environment, Conservation & Parks (MECP) Inspection on November 12th, report #1-OZCPL. The Peterborough Drinking Water System received a 100% compliance rating. There were no recommended best practices noted in the report.

Adverse Water Quality Incidents

There were zero incidents of adverse drinking water quality in 2020.

Drinking Water Quality Management System

On October 30, 2006, the finalized standard was issued on the Environmental Bill of Rights Registry. The purpose of this Standard is to assist owners and operating authorities in the effective management and operation of their municipal residential drinking water systems.

This Standard outlines requirements for a Quality Management System (QMS) to ensure high quality drinking water. In the development of a QMS, the Operating Authority must create an Operational Plan; this document will define the QMS and will be subject to external audits for accreditation. Staff developed and implemented a QMS specific to the Peterborough municipal water system, which received full scope accreditation in June 2011.

The Peterborough Drinking Water System maintained accreditation to the Drinking Water Quality Management Standard (DWQMS). In advance of the annual verification audit an internal audit was conducted in September 2020. The internal audit found two opportunities for improvement and no corrective actions required. The external audit, conducted by NSF International, later in October 2020 described that the management system was well documented and continues to be effective.

Water Flows

Permit to Take Water

The *Ontario Water Resources Act, Regulation 387/05* authorized Peterborough Utilities Commission in accordance with Permit to Take Water, 5167-9BVR6A the withdrawal of 190.68 ML per day. Under this Regulation we are required to report the daily water taking annually by March 31st each year.

In 2020, there were no instances of water taking in excess of this daily limit. The total volume of water pumped into the Water Treatment Plant was 11,116.32 megalitres (ML), this is an average of 30.46 ML daily.

Treated Water Production

The Water Treatment Plant produced 9,707.10 megalitres (ML) in 2020, this is an average of 26.68 ML daily (Chart 1). Historically the highest water consumption recorded was in 1980 (18,621.20 ML).

Peterborough Utilities meters water usage and the majority of water usage in 2020 was by industrial, institutional and large commercial users. There was a certain amount of water used for distribution system maintenance in order to maintain the water quality in the distribution system.



Chart 1

Treated Water Production



█ 2020 water production was 9,707.10

Water Quality Results

No known health-related water quality guidelines for inorganic (Table 2) and organic (Table 3) parameters were exceeded in 2020 in Peterborough's drinking water. In order to ensure that Peterborough's water is safe to drink, water quality is carefully monitored and subject to constant surveillance.

In addition to continuous monitoring of turbidity, chlorine, fluoride and pH levels at the Water Treatment Plant, thousands of water samples are taken each year for chemical, physical and microbiological tests. These tests are carried out on water samples before and after treatment as well as on samples collected from different points in the water distribution system.

A total of approximately 20,000 individual tests were performed on Water Treatment Plant and water distribution samples in 2020. Approximately 13,000 individual tests were performed in the Water Treatment Plant Laboratory and approximately 6,000 microbiological and chemical tests were performed by Peterborough Environmental Protection Laboratory and SGS Lakefield Research Limited.

Results of the laboratory testing continue to confirm that the Peterborough Water Treatment Plant produces good quality water and this quality is maintained throughout the water distribution system to the customer's tap.



O. Reg. 169/03 contains the *Ontario Drinking Water Quality Standards* (ODWQS). The purpose of the Province's ODWQS is to establish parameter limits to protect public health. An exceedance of any parameter would result in an adverse water quality event with notification to the Medical Officer of Health and the MECP. Appropriate corrective action would have to be initiated to address the adverse incident.

Chlorine Residual

The Peterborough Water Treatment Plant uses chlorine for disinfection against viruses and bacteria in accordance with O. Reg. 170/03. Sample results reported under Schedule 7 for plant effluent was 0.798 -2.40 mg/L.

Turbidity

The average raw water turbidity in 2020 was 0.48 NTU; average during 2019 was 0.50 NTU. The monthly raw water turbidity peak occurred in March at 0.60 NTU as shown in Chart 2. The past 20-year average raw water turbidity was 0.57 NTU and treated water turbidity was 0.09 NTU.

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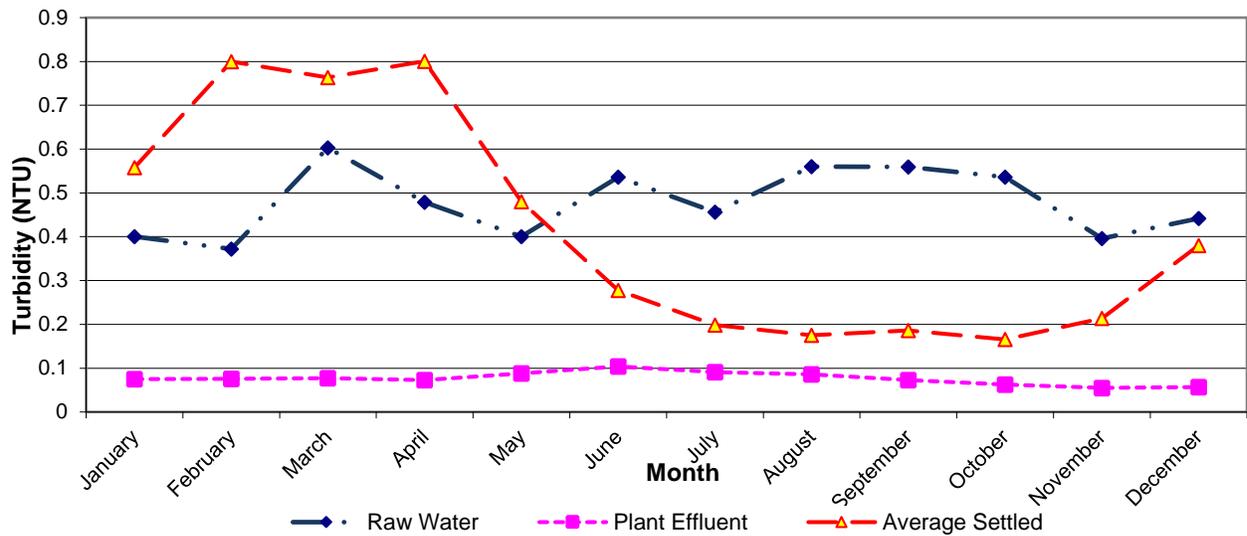
The zebra mussel population in the river could also be a contributing factor for the cyclical increases and decreases in raw water turbidity. Raw water turbidity has slowly dropped since 2008.

The performance criteria for filtered water is 0.30 NTU for 95% of the time,

without exceeding 1.0 NTU. The average filtered water turbidity was 0.04 NTU for 2020 and in 2019 was 0.04 NTU. Filters are taken off-line when the turbidity reaches 0.15 NTU. The 2020 average treated water turbidity was measured at 0.08 NTU.

Chart 2

Average Monthly Turbidity



Microbiological Standards Testing

Escherichia coli

During 2020, a total of 249 Escherichia coli (E.coli) samples were analyzed from the Otonabee River (at the WTP intake) to assist in determining the source of fecal contamination within our source water. Monthly values ranged from 0 to 75 Colony Forming Units (CFU) per liter. A total of 1,534 E.coli samples were analyzed from the plant effluent and distribution system. In 2020, there were no instances where E.coli was detected in the potable drinking water.

Total Coliform

The MECP guidelines for Total Coliform is to have all samples collected from the plant effluent to be zero CFU per litre of water sampled. During 2020, a total of 249 samples were analyzed from the Otonabee River. Monthly values ranged from 12 to 770 Colony Forming Units (CFU) per liter. A total of 1,534 Total Coliforms samples were analyzed from the plant effluent and distribution system. In 2020, there were no instances where Total coliforms were detected in the potable drinking water.

Inorganic Parameters

Table 2

Schedule 23	Unit	2020 Results	MAC
Antimony	mg/L	<0.00009	0.006
Arsenic	mg/L	<0.00002	0.025
Barium	mg/L	0.0262	1.0
Boron	mg/L	0.002	5.0
Cadmium	mg/L	0.000003	0.005
Chromium	mg/L	0.00013	0.05
Mercury	mg/L	<0.00009	0.001
Selenium	mg/L	0.00004	0.01
Uranium	mg/L	0.00003	0.02

Organic Parameters

Table 3

Schedule 24	Unit	2020 Results	MAC
Alachlor	mg/L	<0.00002	0.005
Atrazine + N-dealkylated metabolites	mg/L	<0.00001	0.005
Azinphos-methyl	mg/L	<0.00005	0.02
Benzene	mg/L	<0.00032	0.005
Benzo(a)pyrene	mg/L	<0.000004	0.00001
Bromoxynil	mg/L	<0.00033	0.005
Carbaryl	mg/L	<0.00005	0.09
Carbofuran	mg/L	<0.00001	0.09

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Schedule 24	Unit	2020 Results	MAC
Carbon Tetrachloride	mg/L	<0.00016	0.005
Chlorpyrifos	mg/L	<0.00002	0.09
Diazinon	mg/L	<0.00002	0.02
Dicamba	mg/L	<0.0002	0.12
1,2-Dichlorobenzene	mg/L	<0.00041	0.2
1,4-Dichlorobenzene	mg/L	<0.00036	0.005
1,2-Dichloroethane	mg/L	<0.00035	0.005
Dichloromethane	mg/L	<0.00035	0.05
2,4-Dichlorophenol	mg/L	<0.00015	0.9
2,4-Dichlorophenoxy acetic acid (2,4-D)	mg/L	<0.00019	0.1
Diclofop-methyl	mg/L	<0.0004	0.009
Dimethoate	mg/L	<0.00006	0.02
Diquat	mg/L	<0.001	0.07
Diuron	mg/L	<0.00003	0.15
Glyphosate	mg/L	<0.001	1
Haloacetic acids (HAA)	mg/l	0.0725	0.08
Malathion	mg/L	<0.00002	0.19
2-Methyl-4-chlorophenoxyacetic acid	mg/L	<0.0000012	0.00012
Metolachlor	mg/L	<0.00001	0.05
Metribuzin	mg/L	<0.00002	0.08
Monochlorobenzene	mg/L	<0.0003	0.08
Paraquat	mg/L	<0.001	0.01
Pentachlorophenol	mg/L	<0.00015	0.06
Phorate	mg/L	<0.00001	0.002
Picloram	mg/L	<0.001	0.19
Polychlorinated Biphenyls (PCB)	mg/L	<0.00004	0.003
Prometryne	mg/L	<0.00003	0.001
Simazine	mg/L	<0.00001	0.01
Terbufos	mg/L	<0.00001	0.001
Tetrachloroethylene (perchloroethylene)	mg/L	<0.00035	0.03
2,3,4,6-Tetrachlorophenol	mg/L	<0.0002	0.1
Triallate	mg/L	<0.0001	0.23
Trichloroethylene	mg/L	<0.00044	0.005
2,4,6-Trichlorophenol	mg/L	<0.00025	0.005
Trifluralin	mg/L	<0.00002	0.045
Vinyl Chloride	mg/L	<0.00017	0.002

Trihalomethanes -THM

In Ontario, the Ministry of the Environment Conservation & Parks' Maximum Acceptable Concentrations (MAC) for total THM's (total concentration of chloroform, bromoform, bromodichloromethane and dibromochloromethane) are set to 100 µg/L (annual average) for the distribution system. According to O. Reg. 170/03, distribution THM samples must be collected and analyzed quarterly.

Trihalomethanes (THM's) are formed as a by-product when chlorine is used to disinfect water for drinking. The presence of organic materials along with the use of chlorine in the water treatment process can contribute to the formation of disinfection by-products. The THM's may have adverse health effects at high concentrations and many governments

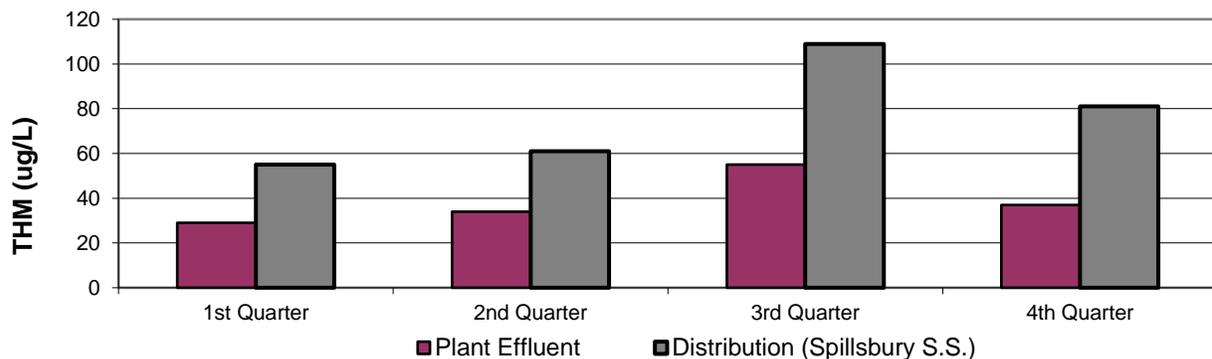
set limits on the amount permissible in drinking water.

The THM average values found leaving the Water Treatment Plant during 2020 was 39 µg/L. The past 10-year average plant effluent has been 41 µg/L.

Distribution levels are always found to be higher than those leaving the Water Treatment Plant since THM's continue to form as the water travels through the distribution piping system. During 2020, one distribution location was selected to assist in determining areas of the city where THM's may be highest. The annual average THM value in the distribution system was 77 µg/L (Chart 3). The average THM value during 2019 was 75 µg/L. The 10-year average of distribution THM concentration was found to be 75 µg/L.

Chart 3

Total Trihalomethanes



Haloacetic Acid

HAA's are another group of chemicals that are formed as disinfection by-products similar to trihalomethanes (THM).

The 2020 average treated water HAA was 34.9 µg/L and the average distribution sample was found to be 63 µg/L. O Reg. 170/03 was amended to include HAAs in 2020. The regulatory limit for distribution samples are 80 µg/L; therefore, the Peterborough Drinking Water System maintained compliance.

Sodium

Sodium is not part of Schedule 23 or 24 but is required to be tested at least once every five (5) years. It has been sampled every year and was found to be below the ODWS aesthetic objective of 200 mg/L. In 2020, the sodium result was found to be 10 mg/L (8.2 mg/L in 2019). The local Medical Officer of Health must be notified when the sodium concentration exceeds 20 mg/L so that this information may be passed on to local physicians.

Lead

Lead sampling is required under O. Reg. 170/03, schedule 15.1. Peterborough requires 8 distribution samples to be collected and analyzed for lead, pH and alkalinity plus two non-residential samples every sampling period. Peterborough is required to sample any residential house in the city that requests sampling for the same parameters mentioned above.

In 2020, we sampled 32 private plumbing (residential) and 49 distribution

points for lead. Customers are offered free testing of their private dwelling. Of the 32 samples taken only one exceeded the Ministry guidelines. Zero distribution samples tested over 0.0005 mg/L which indicates that the distribution system does not contribute to lead contamination.

Taste and Odour

During 2020, the primary source of taste and odour in our raw water was from the naturally occurring compounds geosmin (name derived from the Greek 'earth' and 'smell') and 2-MIB (2-methylisoborneol). These compounds are monitored as a precursor to taste and odour complaints (earthy/musty) of the water and are not a health concern. They can be detected by humans at very low levels (less than 10 ng/L). The bacteria actinomycetes, zebra mussels and some species of algae can produce geosmin and 2-MIB, though all of the contributing organisms are not known. Observations have shown that when we have greater zebra mussel and/or algae populations we experience higher amounts of geosmin and 2-MIB.

Previous annual data indicates that geosmin and 2-MIB would hit peaks at the same time during the summer months. There is usually a large peak near the end of the summer when the water temperature is highest and sunlight hours are high. The concentration peaks for both taste and odour causing compounds occurred approximately July to November.

Geosmin is thought to originate higher in the water column and produce an earthy odour. The average raw water value during 2020 was 6.1 ng/L and the average plant treated water was 6.8 ng/L (Chart 4).

was 4.3 ng/L and the average plant effluent was 4.6 ng/L (Chart 5).

The 2-MIB is produced in the sediment or benthic layer and gives off a musty odour. 2-MIB can reproduce well when sunlight can penetrate down to the bottom of lakes and streams. The average raw water value during 2020

The reduction of geosmin and 2-MIB due to water treatment processes (coagulation, sedimentation, filtration and chlorination) was negligible. Both geosmin and 2-MIB compounds resist oxidation (disinfection) and are difficult to remove by conventional water treatment processes.

Chart 4

Average Monthly Geosmin

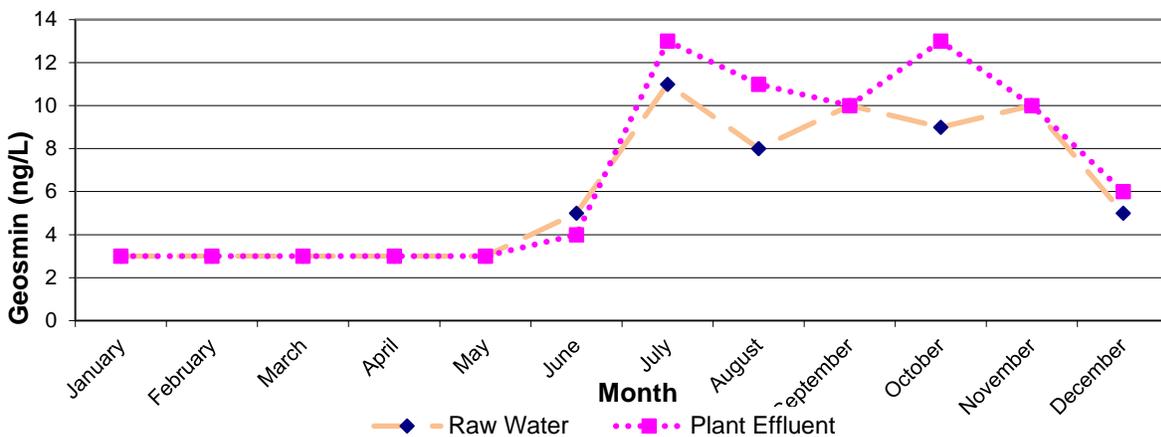
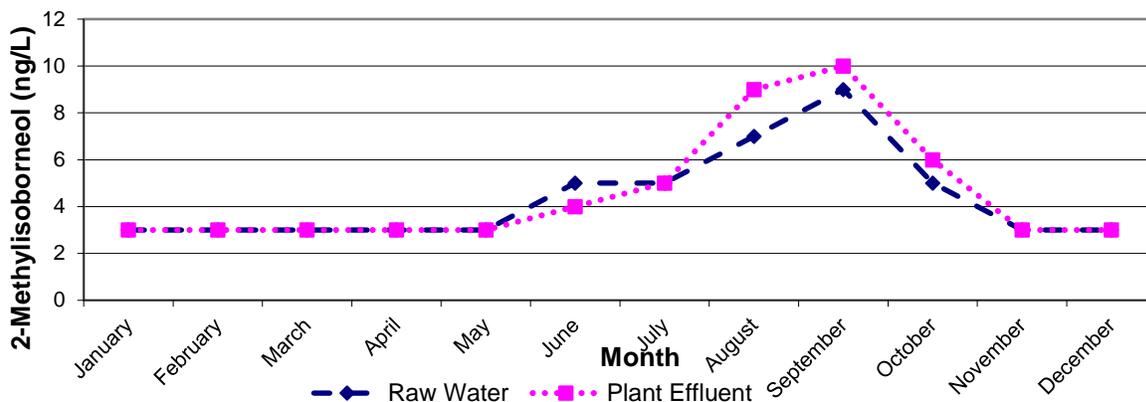


Chart 5

Average Monthly 2-Methylisoborneol (2-MIB)



Summary Report

The summary of water delivered as per O. Reg. 170/03 Schedule 22 in 2020 is shown in Table 4.

Table 4

Month	Average Day (M ³ /d)	Maximum Day (M ³ /d)	Peak Flows (L/m)
January	24,647	33,157	23,026
February	24,753	30,979	21,513
March	24,502	28,903	20,072
April	23,172	24,746	17,185
May	25,814	31,109	21,603
June	30,205	34,889	24,228
July	32,927	38,315	26,608
August	30,731	35,741	24,820
September	28,347	30,413	21,120
October	24,899	26,808	18,617
November	23,835	30,156	20,942
December	24,302	36,729	25,506
Rated Capacity	104.00	----	----
Approved Flowrate	----	190.68	132,743 L/m

Chemical Consumption

Table 5

Chemical Use	2019	2020
Total Chlorine	39,366 kg	36,333 kg
Average Dosage	1.26 mg/L	1.20 mg/L
Total Aluminum Sulphate	827,259 L	803,160 L
Average Dosage	48.5 mg/L	47.2 mg/L
Total Hydrofluosilicic Acid	24,702 L	19,438 L
Average Dosage	0.69 mg/L	0.68 mg/L
Total Sodium Hydroxide	97,776	50,788
Average Dosage	8.5 mg/L	3.18 mg/L

Chlorine

The average dose of chlorine for 2020 was 1.20 mg/L (Table 5). This value fluctuates throughout the year as higher doses of primary chlorine are required during the summer months because it takes more chlorine to disinfect the water when the water is warmer.

Chlorine is also added into the treated water before it leaves the WTP. This secondary chlorine is added to help maintain the chlorine residual throughout the distribution system to comply with the Ontario Drinking Water Standards (ODWS).

Zebra mussel control for the Water Treatment Plant included adding approximately 0.5 mg/L of chlorine into the Water Treatment Plant intakes from May to October. The addition of zebra mussel chlorine is dosed only during the months when there are warmer water temperatures (usually when water temperature is above 12°C). This is when the zebra mussels will colonize on surfaces such as the intake pipe walls.

Hydrofluorosilicic Acid (fluoride)

Hydrofluorosilicic acid (fluoride) was added to the treated water to attain a combined concentration (target value) of 0.70 mg/L. Fluoride is added to the water depending on the total concentration required in the treated water and also the concentration of the raw water. The average dosage of fluoride added to the water in 2020 was approximately 0.68 mg/L (Table 5). The average treated water fluoride residual was 0.61 mg/L. The average fluoride concentration found in the raw water (natural fluoride) during 2020 was 0.10 mg/L.

Sodium Hydroxide

Sodium Hydroxide (NaOH) is normally added to the plant effluent for corrosion control within the distribution system as well as plant effluent pH adjustment. The use of chlorine and aluminium sulphate (alum) during the water treatment process lowers the pH level causing the water to be slightly acidic (corrosive). The addition of NaOH increases the pH to a more acceptable value of 7.1.

Aluminium Sulphate

Aluminium Sulphate (alum) is used as our primary coagulant causing particles (silt, sand, algae, and bacteria) to coagulate or 'clump' to form a floc, which can settle in the sedimentation basins. The water is further treated by filtration. Alum was added to the water during 2020 at an average rate of 47.2 mg/L (Table 5). The average alum dosage during 2019 was 48.5 mg/L. Aluminium residual found in the WTP treated water can be a by-product of the addition of alum. The average treated water aluminium residual for 2020 was 0.033 mg/L the operational guideline for aluminium is 0.1 mg/L.

Water Treatment Plant

Annual maintenance was conducted at the Water Treatment Plant, Water Street Pumphouse, reservoirs, elevated tanks and booster pumping stations.

Water Distribution

Annual water distribution review and maintenance programs are necessary to ensure the safe delivery of drinking water in Peterborough. These programs include:

- ◆ Valve maintenance
- ◆ Hydrant maintenance
- ◆ Dead end flushing
- ◆ Service post repair

Impact of Climate Event

The temperature during June, July and August averaged approximately 27.2°C. This is considered to be above normal summertime temperature. Environment Canada data describes the average normal value of 18.3°C (normal data 1981 – 2010). The summer months in 2020 were hotter than normal with 22 days where temperatures were higher than 30°C. Rainfall totals for the three summer months of June, July and August was 116.6 mm. This is considered to be below normal rainfall values for the three summer months.

Otonabee Regional Conservation Authority (ORCA) issued a Level 1 Low Water declaration on June 18, 2020. This advisory notice is based on the preceding three months period, receiving less than 80% of normal precipitation. Low precipitation levels continued in September and a Level 2

Low was issued on August 11, 2020. When a Level 2 Low Water Condition occurs, all water users are asked to voluntarily reduce their water consumption by 20%. This includes municipalities, aggregate operations, golf courses, water bottlers, farm irrigation, and private users. On September 15, 2020 the region returned to a Level 1 and All advisories were lifted by ORCA on November 12, 2020.

Pilot Plant

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 applications have been investigated. The primary objectives using the ozone pilot were to determine if ozone, advanced oxidation, and biofiltration will enhance our water quality and provide operational flexibility as an integral component of our multi-barrier approach to water treatment.

Ozone and Advanced Oxidation

Pilot scale research has played a prominent role in assessing the Otonabee river source water characteristics and evaluating alternative treatment technologies. Our key objectives were to mitigate disinfection by-product (DBP) formation and improve

taste and odour, through the reduction of geosmin (GSM) and 2-methylisoborneol (2-MIB), compounds released by algae.

Previous research efforts have included coagulation optimization, UF membranes, biofiltration, enhanced coagulation and chloramination. All treatment technologies investigated provided enhanced water quality and operational performance benefits for our system. However, ozone was the only treatment technology to meet all of the key water quality objectives.

Preliminary ozone pilot studies on settled-water and post-filtration applications were shown to effectively ameliorate regulatory DBPs, including trihalomethanes (THMs) and haloacetic acids (HAAs), in addition to the removal of GSM and 2-MIB. Ozone applied pre-filtration was also shown to improve filter performance, reduce natural organic matter, and decrease our chlorine demand. Post-filtration ozonation was shown to provide an additional benefit of 0.5-log *Cryptosporidium* removal. However, due to capital costs and integration barriers associated with pre and post-filtration applications, alternative application points were investigated.

The addition of ozone as a pre-treatment was investigated in 2020. Ozone pre-coagulation was shown to reduce both THMs and HAAs by 33%. Settled and filtered water turbidity was improved, and the coagulant dose was reduced by 20%. Ozone application pre-coagulation was also shown to eliminate GSM and 2-MIB compounds. Ozone added prior to coagulation has the additional benefits of being applied under plug-flow conditions, allows for full-scale application, and can

be placed on-line intermittently or as required. This will provide operational staff with another treatment barrier to optimize water quality and improve process performance.

Granular Activated Carbon Media

Pilot-scale studies have focused on enhanced water quality and improved water quality aesthetics through the use of Granular Activated Carbon (GAC) media. Our objective was to optimize our current treatment strategy to mitigate DBP formation and taste-and-odour compounds, GSM and 2-MIB. GAC media caps integrated with our current filtration technology, were shown to decrease THM and HAA formation by 10% and 12%, respectively. GSM and 2-MIB compounds were reduced below the odour threshold concentration of 9 parts-per-trillion (ppt). GAC media was also shown to reduce filtered water turbidity, reduce chlorine demand, and provide enhanced organic carbon removal and bioactivity, further enhancing water quality and performance. The installation of GAC media caps in 2020 will play a prominent role to immediately enhance water quality and improve aesthetics for our consumers.

Impacts of Ozone on Water Quality

The implementation of ozone will play an integral role as the next generation treatment alternative for the City of Peterborough's Otonabee river source water.

Ozone will provide enhanced water quality through the reduction of regulated DBP compounds, including both THMs and HAAs. Ozone will also optimize our

coagulant use, improve settled water turbidity, enhance biofiltration capabilities, reduce chlorine demand, and provide an additional barrier against microbial pathogens. Ozone has also been shown to eliminate taste and odour compounds, GSM and 2-MIB. These compounds impart an earthy-musty odour that is the primary water quality complaint from the citizens of Peterborough.

Ozone will also play a key role in future applications and treatment challenges. Previous studies have shown the effectiveness of ozone in the reduction of pharmaceuticals, endocrine disrupting compounds, and cyanotoxins. Impacts on water quality from global warming, including the potential increase of blue-green algae, can also be effectively handled through ozone as a component of our multi-barrier approach.

Granular Activated Carbon Media

The installation of GAC media caps was completed in May 2020 in an effort to enhance our water quality and improve aesthetics for our consumers. Pilot-scale studies in 2019 had shown the benefits of GAC as a cost-effective short-term solution to mitigate DBP formation and taste and odour compounds, GSM and 2-MIB.

The GAC caps implemented at full-scale resulted in a 10% decrease in natural organic matter (NOM) in our plant effluent, from 0.046 cm^{-1} to 0.041 cm^{-1} . The decrease in NOM corresponded to a decreased chlorine demand, requiring chlorine doses of 3.37 mg/L compared to 3.58 mg/L in previous years. Plant effluent THM concentration were reduced 10% from 51 to 46 μM ,

however, HAA concentrations were not impacted by GAC caps.

Taste and odour compounds, GSM and 2-MIB, were reduced by 50% and 30%, respectively, in the filters that had GAC caps installed. The reduction in full-scale plant effluent GSM and 2-MIB below the taste and odour threshold of 9 ppb resulted in a 50% reduction in customer complaint calls in 2020 compared to the previous decade.

Customer Service

Customer Calls

Customer concerns relating to water are tracked by WTP staff and logged using computer software. Some questions and concerns that were asked to our WTP staff were related to taste and odour, colour, hardness, general water quality, information on water treatment, sampling, operations, and questions to assist with school projects on water treatment.

In 2020, staff responded to a total of 20 inquiries, this was a decrease of 43% from 2019. The 20 inquiries were related to the following concerns; 20% of customer concern calls were relating to colour (usually rusty coloured water), 10% were relating to particulate matter, a total of 70% relating to taste and odour, and 0% relating to bacteriological concerns (Chart 6).

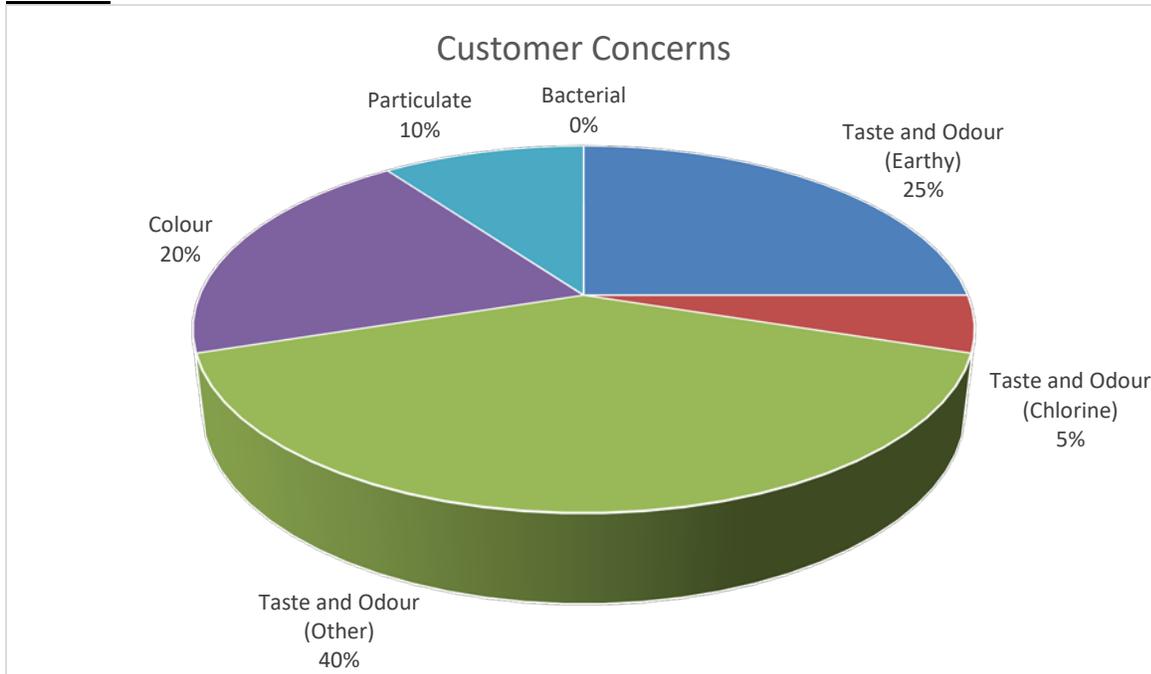
A further breakdown of the 14 taste and odour complaints revealed the following: 5 concerns were for an earthy musty odour, 1 concern was for a chlorine taste and odour, and 8 concerns were for various other taste and odours, from metallic to medicinal.

Tours

Tours have been an important part of public education at the Peterborough Water Treatment Plant. About 36 people had a tour of the Water Treatment Plant

process during 2020 (over 2,621 people in the last 10 years). During 2020 tour numbers were lower than normal due to tours being cancelled starting in March as a result of the pandemic.

Chart 6



Riverview Park & Zoo

In 2020 Riverview Park and Zoo operations were severely impacted by the COVID-19 pandemic. The Park and Zoo was open and operating during regular hours (8:30 AM – dusk) from January 1st to March 13th, 2020, after which, the Park and Zoo closed as a precautionary measure. Most areas and facilities remained closed for the year and the majority of our facility bookings, education programs, special events, etc. were cancelled.



In spite of restrictions and supply issues associated with the pandemic, some progress was made on ongoing improvements to the facilities and equipment in 2020. These included major upgrades to animal exhibits, new lockers at the splash pad, repairs to the Dobbin Building and train ride facilities.

The zoo's animal collection saw many changes in 2020 with the deaths of some of our older animals as well as new acquisitions. Deaths included our bobcat, a domestic yak, a slender-tailed meerkat, a reindeer, and the passing of our last black and white ruffed lemur. Other changes included the acquisition of a few small animals from Cherry Brook Zoo in St. John NB (which was forced to close due to the pandemic),

obtaining two new macaws, and the successful hatching of a Sulawesi forest turtle.

Park Operation & Facilities

Most of the Park and Zoo's areas and facilities were closed for the majority of 2020. The miniature train ride was closed for the year. The zoo area was closed from March 13 until year end, except for escorted private tours that were offered to local residents from mid-August through to Thanksgiving weekend. The Snack Bar and the gift shop remained closed for the year. The splash pad was closed for the year. The park grounds and pathways were open for walk-through access and the disc golf course and playground both opened for limited use starting in May.

Zoo Operations & Facilities

Regular and emergency veterinary care was provided primarily by consulting veterinarian Dr. John Sallaway throughout 2020. Dr. Mike Cranfield was unavailable due to the border closure. Park and Zoo Animal Care Staff worked with Dr. Sallaway throughout the year to provide planned animal health care to the animals in our collection. Animals were examined and/or treated as part of their annual health care program. This included physical exams, surgery,



numerous vaccinations/treatments, blood samples, the trimming of many hooves/claws/beaks/tusks, dentistry, and dental cleaning.

Zoo Animal Collection

In 2020 there were 7 births/hatchings and 10 deaths of animals during the year. Post mortems were performed on those animals that had died, to determine the cause of death where possible. 21 new animals were acquired during the year.

As of December 31, 2020, the animal collection on site consisted of 140 animals, representing a total of 58 species (excluding groups of fish and invertebrates). The collection had 33 animals in on loan and 12 animals out on loan. (Table 6).



Table 6

	January 1	Birth/ Hatchings	Acquisitions	Deaths	Disposition	December 31
# Animals Owned on site	82	6	16	9	2	93
# Animals at Zoo on Loan	29	1	5	1	1	33
# Animals out on loan	13	0	0	0	2	11
Total Animals On Site	111	7	21	10	3	126

Capital Program

Work completed under the 2020 capital program included numerous improvements to the cat exhibit building and holdings, new gardens and landscaping in front of the exhibit, rehabilitation of the chimneys on the Dobbin Building, new lockers at the splash pad, and construction of a new Signal Tower for the miniature train ride. Other improvements to the animal exhibits and holdings included a new compound at the camel exhibit and a new pond at the barnyard.



Revenue Contributions

In 2020, the impact of the pandemic was devastating to Riverview Park and Zoo's revenue for the year with no train operations, no food services, and limited facility bookings and retail sales. Some success was achieved with a pilot of the online sales and curbside pickup of our RPZ and Solar Farm honey. Our

education program revenue was also stronger than expected at \$ 4,800 or 53% of budget.

Fundraising efforts were also curtailed by COVID-19 but some notable achievements were still accomplished. This included a 62% increase of individual donors who gifted over \$15,918 and bench dedications of \$ 8,500 in value. The Rotary Club of Peterborough Kawartha donated \$30,000 for the installation of the Musical Playground. A concentrated effort to promote our animal adoption program yielded outstanding results with a revenue of \$ 32,600 or 272% of budget. We currently have 162 active animal adopters.

Other notable fundraising achievements included support of our Enrichment and Training wish list, in-kind donations of building supplies, equipment and services totaling \$28,000. We were successful in recruiting a Phase I Capital Campaign Patron for the Miniature Train Ride Replacement. A commitment to a \$75,000 grant through the Feira Foundation for the locomotive sponsorship has been awarded. The first installment of \$18,750 was received in December of 2020.

Overall, 2020 development activities included cash donations, fundraising efforts and grants awarded for a total of \$62,000.

Education

Much of the education program planned for March – December 2020 had to be cancelled due to the impact of COVID-19. This included public speaking engagements, “behind-the-scenes” tours, the parent & tot “Zoo Crew” program, our “Zoo Academy” and “Zoo Trek” half-day curriculum-based day sessions as well as the animal placement program developed in support of the project pilot of the Pathway to Stewardship and Kinship regional education initiative.



It was possible to modify some of our programs for remote or virtual delivery. This included a major adaptation of the Bondar Challenge program, a unique experiential program that helps children make a connection to nature through the art of photography. This program was successfully delivered with our participants winning 1st, 2nd and 3rd place in the Ruby Summer Camp National Award category.

Other programming included virtual “Zoo Crew” and virtual “Zoo Trek” tours and invasive species workshops. We were able to reach over 1,500 students through direct in-person or virtual programs in 2020. A focus on our social

media, resources for our new website YouTube channel as mediums for educational programming allowed us to connect to the community through a “Bringing the Zoo to You” Campaign. This included live events and recorded videos available to our 21,479 followers, a 21% increase over 2019 (4,407 Twitter, 12,373 Facebook, 4,699 Instagram).



This programming was made possible through the support of 63 active volunteers in 2020 who supported education programs and guided tours, created virtual program resources at home, participated in litter pick-up and invasive species removal day-events and helped with our pilot honey sale and curbside pick-up. These volunteers contributed over 400 hours in-kind.

In addition, we hosted 5 post-secondary placement students from Conservation Biology, Travel and Tourism and Education Programs that provided over 500 hours of research, resource development and ethogram observations in 2020.

Young Canada Works Heritage grant for Public Education student positions was increased from \$10,000 to \$23,000. Canada Summer Jobs awarded a \$3,500 grant for an Guest Services Position.

Conservation

Last year the Park and Zoo's conservation program included our ongoing support of the Ontario Turtle Conservation Centre's conservation work by donating heat lamp bulbs, turtle feed (smelt) and equipment. In January, Park and Zoo staff attended Otonabee Conservation's annual general meeting and were happy to accept (on behalf of the Park and Zoo) their Conservation Partnership Award.



This award recognized the Park and Zoo's partnership with Otonabee Conservation, jointly delivering many conservation programs and connecting people to nature. These activities included the Roberta Bondar Photography challenge, the seasonal conservation exhibit, yellow fish road (storm water education and awareness) as well as shoreline restoration projects.

The Park and Zoo also participated in the Association of Zoos and Aquariums

(AZA) Stud Book for red-necked wallaby, Sichuan takin and bobcat. We also participated in the African red-billed hornbill, slender-tailed meerkat and common squirrel monkey AZA Species Survival Plans, as well as the Emu and Brazilian agouti Population Management Plans.



Research

In 2020 the Park and Zoo participated in the Ontario Turtle Conservation Centre's Blanding's Turtle research project as well as hosting research projects by university biology and conservation biology students.

Special Events

Unfortunately, all of the special events planned for 2020 had to be cancelled. This included the Peterborough Children's Water Festival and the Summer Concert Series. Although the on-site version 11th annual Riverview Park and Zoo Fun Run was canceled, a virtual run was promoted with runners running on their own time and at individual locations. The virtual run had

43 participants and approximately \$3,800 was raised.

Staff & Volunteers

As of December 2020, permanent staff included 1 Manager and Curator, 1 Park and Zoo Supervisor, 1 Program Supervisor, 1 Groundskeeper, 1 Animal Care Technician, 3.5 Zookeepers and 1 Park & Zoo Maintenance.

The majority of our student positions were cancelled due to the pandemic and the employment periods of the remainder were significantly delayed/reduced. Seasonal staffing peaked in July and August with a total of 9 student employees assisting with Park and Zoo operations. Student employee positions included 4 zookeepers, 2 public educators, and 3 horticulture/groundskeeping workers.

A total of 6 student employees worked part-time hours starting in September. The students supported guided tours on weekends until Thanksgiving, assisted with workload in the park until the end of October, and assisted zoo staff on weekends for the remainder of the calendar year.

The Park and Zoo hosted 5 college/university student placements over the year as well as one high school co-op placement students.

In 2020 the Volunteer Program was very important in 2020 due to COVID-19, with a total of 63 volunteers assisting with our guided tours, education programs, conservation activities and research.

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Appendix A – Financial Statement

**PETERBOROUGH UTILITIES COMMISSION
FINANCIAL STATEMENTS
AT DECEMBER 31, 2020**

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INDEPENDENT AUDITOR'S REPORT

To the Chair and Members of the Peterborough Utilities Commission

Opinion

We have audited the financial statements of Peterborough Utilities Commission (the Commission), which comprise the statement of financial position as at December 31, 2020 and the statements of operations and accumulated surplus, changes in net financial assets and cash flows for the year then ended, and notes to the financial statements, including a summary of significant accounting policies.

In our opinion, the accompanying financial statements present fairly, in all material respects, the financial position of the Commission as at December 31, 2020, and its financial performance and its cash flows for the year then ended in accordance with Canadian Public Sector Accounting Standards.

Basis for Opinion

We conducted our audit in accordance with Canadian generally accepted auditing standards. Our responsibilities under those standards are further described in the Auditor's Responsibilities for the Audit of the Financial Statements section of our report. We are independent of the Commission in accordance with the ethical requirements that are relevant to our audit of the financial statements in Canada, and we have fulfilled our other ethical responsibilities in accordance with these requirements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Responsibilities of Management and Those Charged with Governance for the Financial Statements

Management is responsible for the preparation and fair presentation of the financial statements in accordance with Canadian Public Sector Accounting, and for such internal control as management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, management is responsible for assessing the Commission's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless management either intends to liquidate the Commission or to cease operations, or has no realistic alternative but to do so.

Those charged with governance are responsible for overseeing the Commission's financial reporting process.

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2020 Annual Drinking Water Report

Auditor's Responsibilities for the Audit of the Financial Statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance but is not a guarantee that an audit conducted in accordance with Canadian generally accepted auditing standards will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.

As part of an audit in accordance with Canadian generally accepted auditing standards, we exercise professional judgment and maintain professional skepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.
- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Commission's internal control.
- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management.
- Conclude on the appropriateness of management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Commission's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the Commission to cease to continue as a going concern.
- Evaluate the overall presentation, structure and content of the financial statements, including the disclosures, and whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation.

We communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

Chartered Professional Accountants
Licensed Public Accountants

Baker Tilly KDN LLP

Peterborough, Ontario
April 22, 2021



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PETERBOROUGH UTILITIES COMMISSION
STATEMENT OF FINANCIAL POSITION
At December 31, 2020

	2020 \$	2019 \$
FINANCIAL ASSETS		
Cash (Note 3)	23,494,365	15,108,328
Accounts receivable		
Customer accounts	897,321	955,369
Sewer surcharge	1,257,438	903,535
Sundry	282,452	285,532
Unbilled water revenue on customer accounts	1,579,000	1,362,000
Unbilled sewer surcharge	1,596,000	1,300,000
	29,106,576	19,914,764
LIABILITIES		
Accounts payable and accrued charges	2,252,985	2,923,470
Sewer surcharge payable (Note 7)	3,543,832	2,971,495
Long term debt (Note 4)	14,216,370	9,605,703
Customer deposits	803,223	714,327
	20,816,410	16,214,995
NET FINANCIAL ASSETS	8,290,166	3,699,769
NON-FINANCIAL ASSETS		
Inventories	527,539	423,339
Tangible capital assets (Note 5)	119,408,867	122,125,221
Prepaid expenses	-	291,424
	119,936,406	122,839,984
ACCUMULATED SURPLUS (Note 6)	128,226,572	126,539,753

Approved By The Commission

 _____, Chair

 _____, Member

The accompanying notes are an integral part of this financial statement.

2020 Annual Drinking Water Report

PETERBOROUGH UTILITIES COMMISSION
STATEMENT OF OPERATIONS AND ACCUMULATED SURPLUS
For The Year Ended December 31, 2020

	Budget 2020 \$ (Unaudited)	Actual 2020 \$	Actual 2019 \$
REVENUES			
Sale of water	18,096,000	18,351,206	17,539,039
Contributed capital installation charges	350,000	43,831	213,590
Development charges earned	1,542,000	58,942	218,888
Fire protection	650,000	650,000	650,000
Sewer surcharge billings	422,000	422,000	414,000
Riverview Park and Zoo (Note 11)	281,000	57,172	241,318
Interest	228,000	166,849	336,191
Other	300,000	237,612	348,919
Electricity	425,000	336,372	417,942
Donations	25,000	4,603	19,401
	22,319,000	20,328,587	20,399,288
EXPENSES			
Water treatment and storage	4,629,000	4,189,684	4,216,040
Water distribution	2,268,000	2,530,589	2,550,019
Riverview Park and Zoo (Note 11)	1,726,000	1,678,329	1,938,691
Administration	3,940,000	3,769,095	3,823,270
Amortization	6,470,000	6,197,228	6,185,433
Interest	367,000	276,843	325,964
	19,400,000	18,641,768	19,039,417
ANNUAL SURPLUS	2,919,000	1,686,819	1,359,871
OPENING ACCUMULATED SURPLUS	126,845,000	126,539,753	125,179,882
CLOSING ACCUMULATED SURPLUS	129,764,000	128,226,572	126,539,753

The accompanying notes are an integral part of this financial statement.

2020 Annual Drinking Water Report

PETERBOROUGH UTILITIES COMMISSION
STATEMENT OF CASH FLOWS
For The Year Ended December 31, 2020

	2020 \$	2019 \$
CASH PROVIDED BY (USED IN):		
OPERATIONS		
Annual surplus	1,686,819	1,359,871
Add: Non-cash charges to operations		
Amortization	6,197,228	6,185,433
Contributed capital installation charges	(43,831)	(213,590)
	7,840,216	7,331,714
Change in non-cash working capital items (Note 8)	(627,803)	(13,125)
	7,212,413	7,318,589
INVESTING ACTIVITY		
Purchase of tangible capital assets	(3,437,043)	(6,516,951)
FINANCING ACTIVITIES		
Repayment of long term debt	(1,389,333)	(1,376,000)
Long term debt proceeds	6,000,000	-
	4,610,667	(1,376,000)
NET CHANGE IN CASH DURING THE YEAR	8,386,037	(574,362)
CASH POSITION - BEGINNING OF YEAR	15,108,328	15,682,690
CASH POSITION - END OF YEAR	23,494,365	15,108,328

The accompanying notes are an integral part of this financial statement.

2020 Annual Drinking Water Report

PETERBOROUGH UTILITIES COMMISSION STATEMENT OF CHANGES IN NET FINANCIAL ASSETS For The Year Ended December 31, 2020

	Budget 2020 \$ (Unaudited)	Actual 2020 \$	Actual 2019 \$
Annual Surplus	2,919,000	1,686,819	1,359,871
Acquisition Of Tangible Capital Assets	(8,480,000)	(3,480,874)	(6,730,541)
Amortization Of Tangible Capital Assets	6,470,000	6,197,228	6,185,433
Decrease (Increase) in Inventories	-	(104,200)	(59,868)
Decrease (Increase) in Prepaid Expenses	-	291,424	(284,837)
Change In Net Financial Assets	909,000	4,590,397	470,058
Net Financial Assets, beginning of year	3,192,000	3,699,769	3,229,711
Net Financial Assets, end of year	4,101,000	8,290,166	3,699,769

The accompanying notes are an integral part of this financial statement.

2020 Annual Drinking Water Report

PETERBOROUGH UTILITIES COMMISSION

NOTES TO THE FINANCIAL STATEMENTS

For The Year Ended December 31, 2020

1. NATURE OF ORGANIZATION

Operating under the authority of the Municipal Act, the Peterborough Utilities Commission (the "Commission") provides water services to the residents of the City of Peterborough along with operational governance and funding for the Riverview Park and Zoo.

2. SIGNIFICANT ACCOUNTING POLICIES

The financial statements of the Peterborough Utilities Commission have been prepared in accordance with Canadian generally accepted accounting principles for local governments and their local boards as recommended by the Public Sector Accounting Board of the Chartered Professional Accountants Canada.

Significant aspects of the accounting policies adopted by the Commission are as follows:

(a) Recognition of Revenue and Expenses

Revenue is recorded using the accrual basis of accounting, as water is used by customers. Unbilled revenue is calculated as the estimated consumption between the last meter reading date and the year end date.

The value of distribution systems installed by developers is recorded in revenue as capital installation charges in the year in which the Commission assumes ownership at the fair market value.

Development charges are recognized as revenue when they are transferred out of the reserve fund and spent on growth related projects.

Revenue from fire protection, sewer charges and electricity is recognized when the service is provided.

Expenses are recognized in the period the goods or services are acquired and a legal liability is incurred by transfers are due.

(b) Use of Estimates

The preparation of financial statements in conformity with Canadian generally accepted accounting principles requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities as well as the disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenditures during the year. Significant estimates and assumptions used in the preparation of financial statements include, but are not limited to: estimates of revenue, allowance for doubtful accounts, and amortization rates and carrying values of property, plant and equipment. Actual results could differ from these estimates.

(c) Inventories

Inventories consist of maintenance supplies and construction materials and are valued at the lower of moving average cost and replacement cost.

(d) Tangible Capital Assets

Tangible capital assets are stated at cost or deemed cost. Amortization on the water treatment plant and reservoirs, distribution system and Riverview Park and Zoo (purchased from operating and donated funds) is recorded on a declining balance basis at a rate of 5% per annum. Water meters are amortized on a straight line basis over 20 years. The Commission capitalizes assets with a value of \$5,000 or greater.

Tangible capital assets categorized as construction-in-progress are not amortized until they are put into service.

PETERBOROUGH UTILITIES COMMISSION **NOTES TO THE FINANCIAL STATEMENTS** **For The Year Ended December 31, 2020**

2. SIGNIFICANT ACCOUNTING POLICIES - (Continued)

(e) Reserve Funds

Certain amounts as approved by the Commission and those required under legislative or other authority are set aside in reserve funds for future operating or capital purposes. Transfers to and/or from reserve funds are an adjustment to the respective fund when approved or required by agreement.

The following reserve funds are included in the accumulated surplus:

(i) Water Treatment Plant Reserve Fund

In December 1990, the City of Peterborough passed a by-law authorizing the Peterborough Utilities Commission to establish a reserve fund for the purpose of upgrading the water treatment plant. The established practice is to appropriate 4.2% of the water revenues to this fund each year. Utilization of these funds is authorized by the Commission.

(ii) Development Charges Act Reserve Fund

The Peterborough Utilities Commission is authorized under the City of Peterborough by-law to establish a reserve fund for development charges. The purpose of the fund is to cover growth related net capital costs incurred by the Water Utility for water treatment, storage and distribution systems.

(iii) Park And Zoo Major Projects Reserve Fund

In September 1993, the City of Peterborough passed a by-law authorizing the Peterborough Utilities Commission to establish a reserve fund for major projects at the Riverview Park and Zoo. The revenues received for this fund include donations from estates and the general public, the utility's share of profits from the refreshment booth operations and profits from the sale of birds and animals. Utilization of these funds is authorized by the Commission on a project by project basis based upon the recommendation of the Riverview Park and Zoo Advisory Committee.

(iv) Park and Zoo Animal Care Reserve Fund

In July 1999, the City of Peterborough passed a by-law authorizing the Peterborough Utilities Commission to establish a reserve fund for animal care at the Riverview Park and Zoo. The fund was established through a capital donation from a Peterborough resident. The income generated annually will be used for the care, treatment, habitat or display of the animals at the Riverview Park and Zoo for special or exceptional purposes beyond standard care.

(v) Park and Zoo State of Good Repair Reserve Fund

In November 2016, the Commission authorized the establishment of an internally restricted Riverview Park and Zoo state of good repair reserve fund. The purpose of the fund is to cover major repair and maintenance costs incurred by the Riverview Park and Zoo that would be required to maintain the quality of its tangible capital assets.

(f) Non-Financial Assets

Tangible capital and other non-financial assets are accounted for as assets by the Commission because they can be used to provide services in future periods. These assets do not normally provide resources to discharge the liabilities of the Commission unless they are sold.

2020 Annual Drinking Water Report

PETERBOROUGH UTILITIES COMMISSION
NOTES TO THE FINANCIAL STATEMENTS
For The Year Ended December 31, 2020

3. CASH

	2020 \$	2019 \$
Unrestricted cash	13,180,507	5,649,929
Restricted cash	10,313,858	9,458,399
	23,494,365	15,108,328

4. LONG TERM DEBT

Long term debt is issued on behalf of the Commission by The Corporation of the City of Peterborough and consists of the following:

Date of Maturity/Payment Terms	Interest Rate %	2020 \$	2019 \$
March 5, 2020, annual principal payments of \$660,000, interest paid semi-annually	3.893	-	660,000
July 5, 2027, semi-annual blended payments of \$274,120	3.180	3,416,370	3,845,703
November 6, 2036, semi-annual principal payments of \$150,000 plus interest	2.790	4,800,000	5,100,000
December 15, 2040, semi-annual principal payments of \$150,000 plus interest	2.040	6,000,000	-
		14,216,370	9,605,703

Future repayments for the long term debt are as follows:

	Principal \$	Interest \$	Total \$
2021	1,043,095	357,822	1,400,917
2022	1,057,297	329,129	1,386,426
2023	1,071,955	299,982	1,371,937
2024	1,087,083	270,947	1,358,030
2025	1,102,895	240,262	1,342,957
Thereafter	8,854,245	1,283,651	10,137,896
	14,216,370	2,781,793	16,998,163

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5. TANGIBLE CAPITAL ASSETS

	Water Treatment Plant and Reservoirs \$	Water Distribution System \$	Riverview Park and Zoo \$	Other \$	Construction In Progress \$	Total \$
Cost Or Deemed Cost						
Balance at January 1, 2019	50,711,018	172,976,148	10,553,608	17,403	4,305,169	238,563,346
Additions	313,710	9,544,779	733,859	-	(3,861,807)	8,730,541
Balance At December 31, 2019	51,024,728	182,520,927	11,287,467	17,403	443,362	245,293,887
Additions	285,174	613,311	198,704	-	2,383,685	3,480,874
Balance At December 31, 2020	51,309,902	183,134,238	11,486,171	17,403	2,827,047	248,774,761
Accumulated Amortization						
Balance at January 1, 2019	24,813,573	87,434,107	4,718,310	17,243	-	116,983,233
Amortization for the year	1,190,231	4,685,083	310,111	8	-	6,185,433
Balance At December 31, 2019	26,003,804	92,119,190	5,028,421	17,251	-	123,168,666
Amortization for the year	1,145,691	4,733,609	317,920	8	-	6,197,228
Balance At December 31, 2020	27,149,495	96,852,799	5,346,341	17,259	-	129,365,894
Net Book Value						
At December 31, 2019	25,020,924	90,401,737	6,259,046	152	443,362	122,125,221
At December 31, 2020	24,160,407	86,281,439	6,139,830	144	2,827,047	119,408,867

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NOTES TO THE FINANCIAL STATEMENTS

For The Year Ended December 31, 2020

6. ACCUMULATED SURPLUS

Accumulated surplus consists of the following:

	2020 \$	2019 \$
Operating surplus	12,720,217	4,561,836
Investment in tangible capital assets		
Tangible capital assets - net book value	119,408,867	122,125,221
Long term debt	(14,216,370)	(9,605,703)
Reserve funds (Note 10)	10,313,858	9,458,399
	128,226,572	126,539,753

7. RELATED PARTY AND INTER-ENTITY TRANSACTIONS

The Commission is a board of the City of Peterborough and is consolidated with the City's financial statements. In the ordinary course of business, the Commission enters into transactions with the Corporation of the City of Peterborough and other related corporations. These transactions, which include the sale of water and the purchase and sale of other goods and services, are exchanged at the same prices and terms as arm's length customers. The affiliated corporations of the Commission are:

The City of Peterborough Holdings Inc.,
Peterborough Utilities Services Inc.,
Peterborough Utilities Inc., and
PUG Services Corp.

Details of services provided to Peterborough Utilities Commission during the year by Peterborough Utilities Services Inc. are as follows:

	2020 \$	2019 \$
Expenditures		
Professional services	8,511,592	9,029,241
Building rent	381,216	393,618
Software and equipment rent	109,147	104,000
	9,001,955	9,526,859

Billing and collecting for the sewer surcharge is done by the Commission for the City of Peterborough. During the year \$422,000 (2019 - \$414,000) was recognized as revenue for providing this service. At December 31, the sewer surcharge payable of \$3,543,832 (2019 - \$2,971,495) recognized on the statement for financial position is payable to the City of Peterborough. All amounts owing to the City are unsecured, without interest and no specific terms of repayment.

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PETERBOROUGH UTILITIES COMMISSION NOTES TO THE FINANCIAL STATEMENTS For The Year Ended December 31, 2020

8. CHANGE IN NON-CASH WORKING CAPITAL ITEMS AND OTHER INFORMATION

	2020	2019
	\$	\$
Accounts receivable	(292,775)	54,113
Unbilled revenue and sewer surcharge	(513,000)	(95,000)
Inventories	(104,200)	(59,868)
Prepaid expenses	291,424	(284,837)
Accounts payable and sewer surcharge payable	(98,148)	274,561
Customer deposits	88,896	97,906
	(627,803)	(13,125)
Other information:		
Interest paid	274,740	325,964

9. BUDGET FIGURES

The budget, approved by the Commission, for 2020 is reflected on the Statement of Operations and Accumulated Surplus and the Statement of Changes in Net Financial Assets. The budgets established for capital investment in tangible capital assets are on a project-oriented basis, the costs of which may be carried out over one or more years and, therefore may not be comparable with current year's actual amounts. Budget figures have been reclassified for the purposes of these financial statements to comply with Public Sector Accounting Board reporting requirements. Budget figures are not subject to audit.

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 For The Year Ended December 31, 2020

10. RESERVE FUNDS

	Budget 2020 \$ (Unaudited)	Actual 2020 \$	Actual 2019 \$
TRANSFERS FROM OPERATIONS:			
Sale of water	755,000	757,605	728,877
Development charges	1,542,000	58,942	218,889
Interest	169,000	93,598	199,650
Donations	25,000	4,603	19,401
Riverview park and zoo	50,000	-	-
	2,541,000	914,748	1,166,817
TRANSFERS			
For tangible capital assets	(1,542,000)	(59,289)	(221,420)
CHANGE IN RESERVE FUNDS	999,000	855,459	945,397
OPENING RESERVE FUNDS	9,241,000	9,458,399	8,513,002
CLOSING RESERVE FUNDS	10,240,000	10,313,858	9,458,399
ANALYZED AS FOLLOWS:			
INTERNALLY RESTRICTED			
Water treatment plant reserve fund	9,133,000	9,115,396	8,274,498
Park and zoo state of good repair reserve fund	207,000	103,674	102,835
	9,340,000	9,219,070	8,377,333
EXTERNALLY RESTRICTED			
Park and Zoo major projects reserve fund	634,000	604,410	594,745
Park and Zoo major animal care reserve fund	266,000	490,378	486,321
	900,000	1,094,788	1,081,066
	10,240,000	10,313,858	9,458,399

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11. OPERATIONS FOR RIVERVIEW PARK AND ZOO

	Budget 2020 \$ (Unaudited)	Actual 2020 \$	Actual 2019 \$
EXPENSES			
Maintenance park	650,000	408,137	677,966
Maintenance train	94,000	82	98,476
Animal care and zoo maintenance	982,000	1,270,110	1,162,249
	1,726,000	1,678,329	1,938,691
REVENUES			
Train	130,000	-	106,037
Miscellaneous	151,000	57,172	135,281
	281,000	57,172	241,318
NET EXPENSES FOR THE YEAR	1,445,000	1,621,157	1,697,373

12. COVID-19

On March 11, 2020, the World Health Organization categorized COVID-19 as a pandemic. The potential economic effects within the Commission's environment and in the global markets, possible disruption in supply chains, and measures being introduced at various levels of government to curtail the spread of the virus (such as travel restrictions, closures of non-essential municipal and private operations, imposition of quarantines and social distancing) could have a material impact on the Commission's operations. The extent of the impact of this outbreak and related containment measures on the Commission's operations cannot be reliably estimated at this time, and no amounts have been recorded in these financial statements.

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Appendix B – Abbreviations

Abbreviation	Full Description
2-MIB	2-methlisoborneol
CFU	Colony Forming Unit
COD	Chemical Oxidization Demand
CTS	Calcium Thiosulphate
DBP	Disinfection by-product
DWQMS	Drinking Water Quality Standard
DWRG	Drinking Water Research Group
EDC	Endocrine disrupting compounds
HAA	Haloacetic Acid
KM	Kilometers
L/m	Litres per Minute
m ²	Square Meters
m ³	Cubic Meters
MAC	Maximum Acceptable Concentration
mg/L	Milligram per Litre
ML	Megalitres
MECP	Ministry of Environment & Climate Change
MOH	Medical Officer of Health
ng/L	Nanogram per Litre
NTU	Nephelometric Turbidity Unit
ODWQS	Ontario Drinking Water Quality Standards
ORCA	Otonabee Region Conservation Authority
ORP	Oxidative Reduction Potential
PACL	Polyaluminum Hydroxychloride
PUC	Peterborough Utilities Commission
PUGSC	Peterborough Utilities Services Inc.
RP& Z	Riverview Park & Zoo
STS	Sodium thiosulphate
THM	Trihalomethane
TOC	Total Organic Carbon
µg/L	Microgram per Litre
UVA	Ultra Violet Absorbance
WTP	Water Treatment Plant
