



Ontario Clean Water Agency
Agence Ontarienne Des Eaux

Charlton Drinking Water System

2020 ANNUAL/SUMMARY REPORT

Prepared by the Ontario Clean Water Agency
on behalf of the Municipality of Charlton and Dack

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INTRODUCTION

Municipalities throughout Ontario have been required to comply with Ontario Regulation 170/03 made under the *Safe Drinking Water Act* (SDWA) since June 2003. The Act was enacted following recommendations made by Commissioner O'Conner after the Walkerton Inquiry. The Act's purpose is to protect human health through the control and regulation of drinking water systems. O. Reg. 170/03 regulates drinking water testing, use of licensed laboratories, treatment requirements and reporting requirements.

Section 11 of Regulation 170/03 requires the owner to produce an Annual Report. This report must include the following:

1. Description of system & chemical(s) used
2. Summary of any adverse water quality reports and corrective actions
3. Summary of all required testing
4. Description of any major expenses incurred to install, repair or replace equipment

This annual report must be completed by February 28th of each year.

Schedule 22 of the regulation also requires a Summary Report which must be presented & accepted by Council by March 31st of each year for the preceding calendar year.

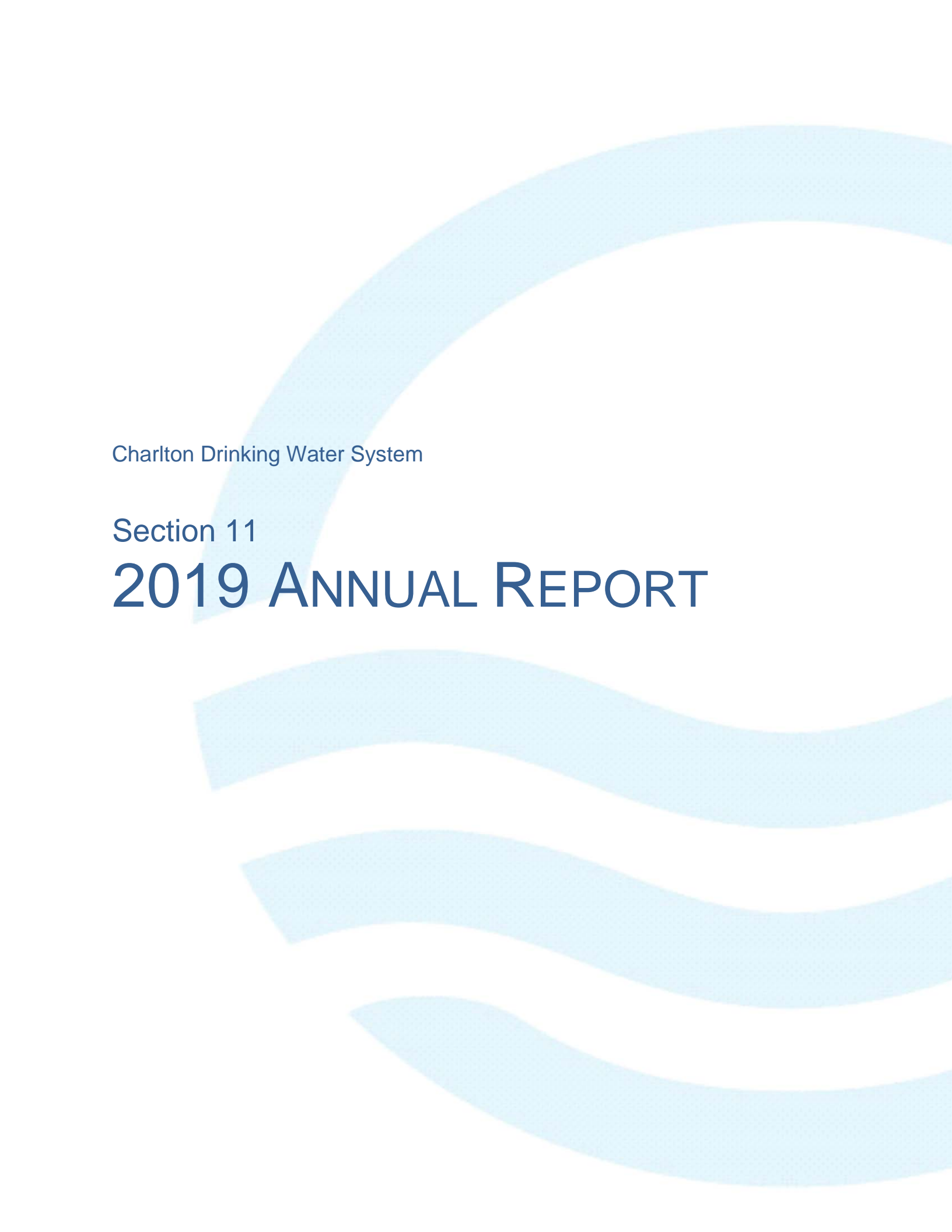
The report must list the requirements of the Act, its regulations, the system's Drinking Water Works Permit (DWWP), Municipal Drinking Water Licence (MDWL), Certificate of Approval (if applicable), and any regulatory requirements the system failed to meet during the reporting period. The report must also specify the duration of the failure, and for each failure referred to, describe the measures that were taken to correct the failure.

The *Safe Drinking Water Act* (2002) and the drinking water regulations can be viewed at the following website: <http://www.e-laws.gov.on.ca>.

To enable the Owner to assess the rated capacity of their system to meet existing and future planned water uses, the following information is also required in the report.

1. A summary of the quantities and flow rates of water supplied during the reporting period, including the monthly average and the maximum daily flows,
2. A comparison of the summary to the rated capacity and flow rates approved in the systems approval, drinking water works permit or municipal drinking water licence or a written agreement if the system is receiving all its water from another system under an agreement.

The reports have been prepared by the Ontario Clean Water Agency (OCWA) on behalf of the Owner and presented to council as the 2020 Annual/Summary Report.



Charlton Drinking Water System

Section 11

2020 ANNUAL REPORT



Section 11 - ANNUAL REPORT

1.0 INTRODUCTION

Drinking-Water System Name:	Charlton Drinking Water System
Drinking-Water System No.:	220005768
Drinking-Water System Owner:	The Corporation of the Municipality of Charlton & Dack
Drinking-Water System Category:	Large Municipal, Residential System
Period being reported:	January 1, 2020 to December 31, 2020

Does your Drinking Water System serve more than 10,000 people? No

Is your annual report available to the public at no charge on a web site on the Internet? Yes
at <http://www.charltonanddack.com/>

Location where the report required under O. Reg. 170/03 Schedule 22 will be available for inspection.

Municipality of Charlton & Dack
#287237 Spruce Grove Road
Englehart ON P0J 1H0

Drinking Water Systems that receive drinking water from the Charlton Drinking Water System

The Charlton Drinking Water System provides all drinking water to the community of Charlton.

The Annual Report was not provided to any other Drinking Water System Owners.

The Ontario Clean Water Agency prepared the 2020 Annual/Summary Report for the Charlton Drinking Water System and provided a copy to the system owner; the Municipality of Charlton & Dack. The Charlton Drinking Water System is a stand-alone system that does not receive water from or send water to another system.

Notification to system users that the Annual Report is available for viewing is accomplished through:

- Notice on the municipality's Facebook page
- Discussions during public council meetings.

2.0 CHARLTON DRINKING WATER SYSTEM (DWS No. 220005768)

The Charlton Drinking Water System is owned by the Corporation of the Municipality of Charlton and Dack and consists of a Class 2 water treatment subsystem and a Class 1 water distribution subsystem. The Ontario Clean Water Agency is the accredited operating authority and is designated as the Overall Responsible Operator for both the water treatment and water distribution facilities.

Raw Water Supply

The water treatment plant is located on the west bank of the Englehart River on Bay Street in the Town of Charlton and has a maximum rated capacity of 561 m³/day. The raw water intake system consists of an 83 m long, 200 mm diameter pipe that extends approximately 70 meters into the Englehart River. The pipe is equipped with a vertical intake riser, with manual height adjustment and perforated with 150 mm diameter holes which are covered with 20 mm diameter high density polyethylene mesh. A sand bag weighted drum secures the pipe to the river bed. The intake pipe supplies a 13.6 cubic meter low lift pumping station equipped with three submersible pumps each rated at 3.25 litres per second (L/s).

Water Treatment

The treatment process consists of chemically assisted filtration using a single train “*Ecodyne Monoplant*” package treatment system housed in a 15 m by 16 m building. The process involves pH adjustment with soda ash, flash mixing/coagulation with alum, flocculation with the assistance of polymer, upflow clarification using settling tubes, pre-chlorination using sodium hypochlorite (which is used as needed) and dual media filtration through two sand and anthracite filters. As the water exits the common filter underdrain the water is post-chlorinated using sodium hypochlorite (primary disinfection). An on-line turbidimeter is used to monitor the turbidity off the filters.

Water Storage and Pumping Capabilities

The filtered water enters a 133 m³ chlorine contact chamber then flows to a 227 m³ clearwell. Free chlorine residual is continuously monitored at this point to ensure primary disinfection is achieved. Ammonium sulphate is added at the discharge of the chlorine contact tank to produce a combined chlorine residual before entering the distribution system (secondary disinfection).

There are three high lift pumps each rated at 4.85 L/s that can direct water to the distribution system. High lift pump #1 is not in service and locked out because it is located in the chlorine contact tank. Water pumped from this location does not meet chlorine contact time (CT) requirements. High lift pumps # 2 and #3 are located in the clearwell and are equipped with variable frequency drives (VFDs). A hydro-pneumatic tank having a volume of 1500 L provides pressure to the distribution system. The treated water is monitored for flow and total chlorine residual using continuous on-line analyzers.



Waste Management

Residue management consists of one 50 cubic meter wastewater/backwash surge tank, equipped with a sludge pump rated at 5.1 L/s and a 29.7 cubic meter waste settling tank with a sludge transfer pump.

The process waste is generated from clarifier blowdown, filter backwash effluent and clean-up water which are gravity fed to the surge tank. The wastewater level in the surge tank is controlled by a float operated submersible pump which transfers the wastewater to the waste settling tank. The tank allows for solids to settle before the supernatant is discharged to the Englehart River. An effluent weir permits the discharge of the supernatant to the river via an effluent outfall sewer. The built-up sludge is pumped to a tanker truck for disposal.

Composite samples of the effluent are collected monthly and tested for total suspended solids (TSS).

Emergency Power

An 80 kW standby diesel generator set is available on-site to provide power to the water treatment facility during power failures.

Distribution System

The Charlton Water Supply System is classified as a Large Municipal Residential Drinking Water System which serves a population of approximately 250 residents through an estimated 123 service connections. The distribution system is comprised of 6" PVC-constructed ("Blue Brute") lines which were approved for installation in 1988. Other than the clearwell in the water plant, there is no off-site water storage facility associated with the system. There is only one fire hydrant within the distribution system and it's located on the property of the water treatment plant.

3.0 LIST OF CHEMICALS USED OVER THE REPORTING PERIOD

The following chemicals were used in the treatment process at the Charlton Water Treatment Plant.

- Sodium Hypochlorite – Disinfection
- Ammonium Sulphate – Chloramination
- Sodium Carbonate (Soda Ash) - pH Adjustment
- Alum (Aluminum Sulphate) - Coagulation/Flocculation
- Poly Electrolyte - Coagulant Aid

All treatment chemicals meet AWWA and NSF/ANSI standards.

4.0 SIGNIFICANT EXPENSES INCURRED IN THE DRINKING WATER SYSTEM

OCWA is committed to maintaining the assets of the drinking water system and maintains a program of scheduled inspection and maintenance activities using a computerized Work Management System (WMS).

Significant expenses incurred in the drinking water system include:

- Replaced pneumatic isolation valve located immediately before the raw water flow meter with a new electric isolation valve which is used to re-direct water to the truck fill station.
- Replaced polymer metering pump with new Gamma X metering pump with pace to flow feature
- Repaired flash mix motor mounting plate to fix vibration issues
- Replaced slow mix motor
- Replaced head and tubing for peristaltic pump;
- Repaired faulty control board inside the turbidity meter
- Replaced polymer pump
- Constructed chemical mixing platform
- Repaired ammonia pump

5.0 DETAILS ON NOTICES OF ADVERSE TEST RESULTS AND OTHER PROBLEMS REPORTED TO & SUBMITTED TO THE SPILLS ACTION CENTER

Based on information kept on record by OCWA, one (1) adverse water quality incident was reported to the Ministry's Spills Action Centre in 2020.

Date	AWQI No.	Details
October 9, 2020	152515	<p>Treated water (POE) sample collected on October 5th: Sodium result = 28700 ug/L (28.7 mg/L).</p> <p><u>Notification:</u> Verbally notified SAC, MOH and Owner; emailed report on October 9th.</p> <p><u>Corrective Action:</u> Resamples collected on October 9th: resample result = 30600 ug/L (30.6 mg/L). Health Unit notified on October 19th. Issue resolved on October 19, 2020.</p>

6.0 MICROBIOLOGICAL TESTING PERFORMED DURING THE REPORTING PERIOD

Summary of Microbiological Data

Sample Type	# of Samples	Range of <i>E. coli</i> Results (min to max)	Range of Total Coliform Results (min to max)	# of HPC Samples	Range of HPC Results (min to max)
Raw (Englehart River)	52	<2 to 40	<2 to 685	0	N/A
Treated	52	0 to 0	0 to 0	52	< 10 to 100

Summary of Microbiological Data

Sample Type	# of Samples	Range of <i>E. coli</i> Results (min to max)	Range of Total Coliform Results (min to max)	# of HPC Samples	Range of HPC Results (min to max)
Distribution	104	0 to 0	0 to 0	52	< 10 to 140

Maximum Allowable Concentration (MAC) for *E. coli* = 0 Counts/100 mL

MAC for Total Coliforms = 0 Counts/100 mL

"<" denotes less than the laboratory's method detection limit.

Notes:

- One microbiological sample is collected and tested each week from the raw and treated water supply. A total of two microbiological samples are collected and tested each week from the Charlton distribution system. At least 25% of the distribution samples must be tested for HPC bacteria.

Refer to [Appendix A](#) for a monthly summary of microbiological test results.

7.0 OPERATIONAL TESTING PERFORMED DURING THE REPORTING PERIOD

Continuous Monitoring in the Treatment Process

Parameter	# of Samples	Range of Results (min to max)	Unit of Measure	Standard
Turbidity	8760	0.00 to 1.99*	NTU	≤ 1.0 (for >15 min)
Free Chlorine (contact chamber)	8760	0.862 to 4.73	mg/L	CT**

Notes:

- For continuous monitors 8760 is used as the number of samples.
- * Effective backwash procedures and automatic pump shut down features are in place to ensure that the effluent turbidity requirements as described in the Filter Performance Criteria are met all times. The Charlton water treatment process automatically shuts down if the filter effluent turbidity reaches 0.8 NTU after 72 seconds or 4 minutes after a backwash. In 2020, the system shut down during all high turbidity events.
- ** CT is the concentration of chlorine in the water times the time of contact that the chlorine has with the water. It is used to demonstrate the level of disinfection treatment in the water. CT calculations are performed for the Charlton water plant if the free chlorine residual level drops below 0.90 mg/L in the winter months and 0.40 mg/L in the summer months to ensure primary disinfection is achieved.

March 22, November 20 and November 21 - low treated water free chlorine residual results were less than 0.9 mg/L. CT calculations performed and passed.

Summary of Chlorine Residual Data in the Distribution System

Parameter	# of Samples	Range of Results (min to max)	Unit of Measure	Standard
Combined Chlorine Residual	364	0.22* to 2.41	mg/L	≥ 0.25

Notes:

- A total of seven operational checks for chlorine residual in the distribution system are collected each week. Four (4) samples are tested one day and three (3) on a second day. The sample sets are collected at least 48-hours apart and samples collected on the same day are from different locations.
- * On August 11th, a combined chlorine residual tested at the Rink gave a result of 0.22 mg/L (free chlorine residual = 0.05 mg/L). The Charlton drinking water system provides chloramination for secondary disinfection and the system must be operated so that

the combined chlorine residual in the distribution system is never less than 0.25 mg/L. This result was reported as a non-compliance. Three other locations sampled that day had combined residuals well above 0.25 mg/L (1.59, 1.76 and 1.95 mg/L).

Refer to [Appendix B](#) for a monthly summary of the above operational data.

Summary of Nitrate & Nitrite Data (sampled at the plant's point of entry into the distribution every quarter)

Date of Sample	Nitrate Result Value	Nitrite Result Value	Unit of Measure	Exceedance
January 13	< 0.05	< 0.05	mg/L	No
April 14	0.38	< 0.05	mg/L	No
July 14	0.07	< 0.05	mg/L	No
October 14	<0.05	< 0.05	mg/L	No

Maximum Allowable Concentration (MAC) for Nitrate = 10 mg/L
 MAC for Nitrite = 1 mg/L

Summary of Total Trihalomethane Data (sampled in the distribution system every quarter)

Date of Sample	Result Value	Unit of Measure	Running Average	Exceedance
January 13	33.3	ug/L		
April 14	39.8	ug/L		
July 14	52.0	ug/L	47.5	No
October 5	64.7	ug/L		

Maximum Allowable Concentration (MAC) for Total Trihalomethanes = 100 ug/L (Four Quarter Running Average)

Summary of Total Haloacetic Acid Data (sampled in the distribution system every quarter)

Date of Sample	Result Value	Unit of Measure	Running Average	Exceedance
January 13	53.0	ug/L		
April 14	25.0	ug/L		
July 14	39.0	ug/L	41.8	No
October 5	50.0	ug/L		

Maximum Allowable Concentration (MAC) for Total Haloacetic Acid = 80 ug/L (Four Quarter Running Average)

Summary of Most Recent Lead Data under Schedule 15.1

(applicable to the following drinking water systems; large municipal residential systems, small, municipal residential systems, and non-municipal year-round residential systems)

The Charlton Drinking Water System was eligible to follow the “Exemption from Plumbing Sampling” as described in section 15.1-5(9) and 15.1-5(10) of Schedule 15.1 of Ontario Regulation 170/03. The exemption applies to a drinking water system if, in two consecutive periods at reduced sampling, not more than 10% of all samples from plumbing exceed the maximum allowable concentration (MAC) of 10 ug/L for lead. As such, the system was required to test for total alkalinity and pH in one distribution sample collected during the periods of December 15 to

April 15 (winter period) and June 15 to October 15 (summer period). This testing is required in every 12-month period with lead testing in every third 12-month period.

Two rounds of lead, alkalinity and pH testing were carried out on March 16th and September 16th of 2020. Results are summarized in the table below.

Summary of Lead Data (sampled in the distribution system)

Date of Sample	No. of Samples	Field pH	Field Temperature (°C)	Alkalinity (mg/L)	Lead (ug/L)
March 16	1	7.41	6.1	124	< 0.1
September 16	1	6.66	13.1	104	1.8

Note: Next lead sampling scheduled for 2023

Most Recent Schedule 23 Inorganic Data Tested at the Water Treatment Plant

Parameter	Result Value	Unit of Measure	MAC	MAC Exceedance	½ MAC Exceedance
Antimony	< 0.5	ug/L	6	No	No
Arsenic	< 1.0	ug/L	10	No	No
Barium	12.0	ug/L	1000	No	No
Boron	7.0	ug/L	5000	No	No
Cadmium	< 0.1	ug/L	5	No	No
Chromium	< 1.0	ug/L	50	No	No
Mercury	< 0.1	ug/L	1	No	No
Selenium	0.2	ug/L	50	No	No
Uranium	< 1.0	ug/L	20	No	No

Note: Sample required every 12 months (sample date = October 5, 2020)

Most Recent Schedule 24 Organic Data Tested at the Water Treatment Plant

Parameter	Result Value	Unit of Measure	MAC	MAC Exceedance	½ MAC Exceedance
Alachlor	< 0.356	ug/L	5	No	No
Atrazine + N-dealkylated metabolites	< 0.5	ug/L	5	No	No
Azinphos-methyl	< 0.267	ug/L	20	No	No
Benzene	< 0.1	ug/L	1	No	No
Benzo(a)pyrene	< 0.01	ug/L	0.01	No	No
Bromoxynil	< 0.11	ug/L	5	No	No
Carbaryl	< 1.0	ug/L	90	No	No
Carbofuran	< 2.0	ug/L	90	No	No
Carbon Tetrachloride	< 0.2	ug/L	2	No	No
Chlorpyrifos	< 0.267	ug/L	90	No	No
Diazinon	< 0.267	ug/L	20	No	No
Dicamba	< 0.137	ug/L	120	No	No
1,2-Dichlorobenzene	< 0.3	ug/L	200	No	No

Most Recent Schedule 24 Organic Data Tested at the Water Treatment Plant

Parameter	Result Value	Unit of Measure	MAC	MAC Exceedance	½ MAC Exceedance
1,4-Dichlorobenzene	< 0.3	ug/L	5	No	No
1,2-Dichloroethane	< 0.3	ug/L	5	No	No
1,1-Dichloroethylene (vinylidene chloride)	< 0.3	ug/L	14	No	No
Dichloromethane	< 1.0	ug/L	50	No	No
2-4 Dichlorophenol	< 0.2	ug/L	900	No	No
2,4-Dichlorophenoxy acetic acid (2,4-D)	< 0.412	ug/L	100	No	No
Diclofop-methyl	< 0.137	ug/L	9	No	No
Dimethoate	< 0.267	ug/L	20	No	No
Diquat	< 0.2	ug/L	70	No	No
Diuron	< 7.0	ug/L	150	No	No
Glyphosate	< 20.0	ug/L	280	No	No
Malathion	< 0.267	ug/L	190	No	No
Metolachlor	< 0.178	ug/L	50	No	No
Metribuzin	< 0.178	ug/L	80	No	No
Monochlorobenzene	< 0.5	ug/L	80	No	No
Paraquat	< 0.2	ug/L	10	No	No
Polychlorinated Biphenyls (PCBs)	< 0.06	ug/L	3.0	No	No
Pentachlorophenol	< 0.3	ug/L	60	No	No
Phorate	< 0.178	ug/L	2	No	No
Picloram	< 0.096	ug/L	190	No	No
Prometryne	< 0.089	ug/L	1	No	No
Simazine	< 0.267	ug/L	10	No	No
Terbufos	< 0.178	ug/L	1	No	No
Tetrachloroethylene	< 0.3	ug/L	10	No	No
2,3,4,6-Tetrachlorophenol	< 0.2	ug/L	100	No	No
Triallate	< 0.178	ug/L	230	No	No
Trichloroethylene	< 0.2	ug/L	50	No	No
2,4,6-Trichlorophenol	< 0.2	ug/L	5	No	No
2-methyl-4-chlorophenoxyacetic acid (MCPA)	< 6.86	ug/L	100	No	No
Trifluralin	< 0.178	ug/L	45	No	No
Vinyl Chloride	< 0.1	ug/L	1	No	No

Note: Sample required every 12 months (sample date = *October 5, 2020*)

Inorganic or Organic Test Results that Exceeded Half the Standard Prescribed in Schedule 2 of the Ontario Drinking Water Quality Standards.

No inorganic or organic parameter(s) listed in Schedule 23 and 24 of Ontario Regulation 170/03 exceeded half the standard found in Schedule 2 of the Ontario Drinking Water Standard (O. Reg. 169/03) during the reporting period.

Most Recent Sodium Data Sampled at the Water Treatment Plant

Date of Sample	No. of Samples	Result Value	Unit of Measure	Standard	Exceedance
October 5, 2020	1	28.7	mg/L	20	Yes
October 9, 2020 (resample)	1	30.6	mg/L	20	Yes

Note: Sample required every 60 months. Next sampling scheduled for October 2025

The aesthetic objective for sodium in drinking water is 200 mg/L at which it can be detected by a salty taste. It is required that the local Medical Officer of Health be notified when the concentration exceeds 20 mg/L so that persons on sodium restricted diets can be notified by their physicians. The adverse sodium result was reported to SAC and the Timiskaming Health Unit on October 9, 2020 as required under Schedule 16 of O. Reg. 170/03 (AWQI# 152515).

Most Recent Fluoride Data Sampled at the Water Treatment Plant

Date of Sample	No. of Samples	Result Value	Unit of Measure	Standard	Exceedance
October 5, 2020	1	< 0.05	mg/L	1.5	No

Note: Sample required every 60 months. Next sampling scheduled for October 2025

Additional Testing Performed in Accordance with an Approval, Order or Legal Instrument

Condition 1.5 of Schedule C to Municipal Drinking Water Licence (MDWL) #271-101 requires that the annual average concentration of total suspended solids (TSS) from the effluent discharged to the Englehart River not exceed 25 mg/L. Further, Condition 4.4 of Schedule C to the MDWL requires that composite samples are collected every month.

The Charlton water treatment plant did not exceed this limit in 2020.

Summary of Total Suspended Solids Data from the Effluent Discharge

Date of Sample	No. of Samples	Result Value	Unit of Measure	Annual Average	Limit
January 14	1	2.5	mg/L	<8.2	≤ 25
February 11	1	20.5			
March 9	1	6.0			
April 14	1	<1			



Summary of Total Suspended Solids Data from the Effluent Discharge

Date of Sample	No. of Samples	Result Value	Unit of Measure	Annual Average	Limit
May 12	1	2			
June 9	1	2.5			
July 14	1	5			
August 11	1	16			
September 8	1	29			
October 13	1	4			
November 9	1	3			
December	1	6.5			



Charlton Drinking Water System

Schedule 22

2020 SUMMARY REPORT

FOR MUNICIPALITIES



Schedule 22 - SUMMARY REPORTS FOR MUNICIPALITIES

1.0 INTRODUCTION

Drinking-Water System Name:	Charlton Drinking Water System
Municipal Drinking Water Licence (MDWL):	271-101-2 (issued February 8, 2016)
Drinking Water Work Permit (DWWP):	271-201-2 (issued February 8, 2016)
Permit to Take Water (PTTW):	6225-AC9GWP (issued July 27, 2016)
Period being reported:	January 1, 2020 to December 31, 2020

2.0 REQUIREMENTS THE SYSTEM FAILED TO MEET

According to information kept on record by OCWA, the Charlton Drinking Water System failed to meet the following requirement which was identified in the 2020 MECP Inspection Report:

Drinking Water Legislation	Requirement(s) the System Failed to Meet	Duration	Corrective Action(s)	Status
Section 7-2(3) of Schedule 7 of O. Reg. 170/03.	<p>On 9 occasions, from November 25th, 2019 to December 18th, 2019, the total chlorine residual in the distribution system exceeded the upper range of the hand-held colorimeter (2.2 mg/L) and was mistakenly recorded as the actual total chlorine residual. The actual total chlorine residual and combined chlorine residual are unknown on the 9 occasions where the operator recorded 2.2 mg/L.</p> <p>This issue was identified in the 2019-2020 MECP Inspection Report.</p>	From November 25, 2019 to December 18, 2019	<p>A procedure was developed to clearly indicate how to properly use the pocket colourimeter in low range mode, high range mode and will describe steps to follow for diluting samples. The procedure will be located in the system’s Operations Manual.</p> <p>A training session was held on September 10, 2020 to review the procedure and to provide hands-on training for all operators.</p> <p>A new bi-weekly check to ensure distribution samples are not missed has been implemented. The operators will send pictures of the chlorine residual sheet to a KL text chat group which includes all operators and PCT. The PCT and a</p>	Complete

Drinking Water Legislation	Requirement(s) the System Failed to Meet	Duration	Corrective Action(s)	Status
			designated operator are the main persons responsible for reviewing the information, but all operators will look at the sheets to ensure samples are collected as required.	
Section 1-2 of Schedule 1 of O. Reg. 170/03.	<p>On August 11th, a combined chlorine residual tested in the distribution system (Rink) was 0.22 mg/L (free chlorine residual = 0.05 mg/L).</p> <p>The Charlton drinking water system provides chloramination for secondary disinfection and the system must be operated so that the combined chlorine residual in the distribution system is never less than 0.25 mg/L.</p> <p>Three other distribution locations sampled that day had combined residuals well above 0.25 mg/L (1.59, 1.76 and 1.95 mg/L).</p>	August 11, 2020	The results and regulatory limits were discussed at a meeting held on October 22, 2020. Operators were reminded that that sample lines must be flushed appropriately to ensure a representative distribution water sample is collected and tested.	Complete

It should also be mentioned that, one (1) adverse water quality incident occurred during the reporting period and was reported to the Ministry's Spills Action Center. Refer to Section 5.0 – *Details on Notices of Adverse Test Results and Other Problems Reported to & Submitted to the Spills Actions Center* on page 5 of this report for details.

3.0 SUMMARY OF FLOWS AND COMPARISON TO REGULATORY LIMITS

Flow Monitoring

MDWL No. 271-101 requires the owner to install a sufficient number of flow measuring devices to permit the continuous measurement and recording of:

- the flow rate and daily volume of treated water that flows from the treatment subsystem the distribution system, and the flow rate and daily volume of water that flows into the treatment subsystem.

The flow monitoring equipment identified in the MDWL is present and operating as required.

These flow meters are calibrated on an annual basis as specified in the manufacturers' instructions.

Water Usage

The following water usage tables summarize the quantities and flow rates of water taken and produced during the 2020 reporting period, including total monthly volumes, average monthly volumes, maximum monthly volumes, and maximum flow rates.

Raw Water

2020- Monthly Summary of Water Takings from the Source (Englehart River)

Regulated by Permit to Take Water (PTTW) #6225-AC9GWP, issued July 27, 2016

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year to Date
Total Volume (m ³)	1558	1441	1674	1629	2324	3243	3720	3210	2720	2356	2127	2646	28648
Average Volume (m ³ /d)	50	50	54	54	75	108	120	104	91	76	71	85	78
Maximum Volume (m ³ /d)	79	72	111	97	186	192	168	163	147	101	97	105	192
PTTW - Maximum Allowable Volume (m ³ /day)	842	842	842	842	842	842	842	842	842	842	842	842	842
Maximum Flow Rate (L/min)	188	187	193	191	195	196	196	194	194	189	186	187	196
PTTW - Maximum Allowable Flow Rate (L/min)	585	585	585	585	585	585	585	585	585	585	585	585	585

The system's Permit to Take Water #6225-AC9GWP allows the municipality to withdraw a maximum volume of 842.4 cubic meters from the Englehart River each day. A review of the raw water flow data indicates that the system did not exceed the maximum allowable volume or maximum flow rate during the reporting period.

Treated Water

2020 - Monthly Summary of Treated Water Supplied to the Distribution System

Regulated by Municipal Drinking Water Licence (MDWL) #271-101 - Issue 2, issued February 8, 2016

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year to Date
Total Volume (m ³)	1264	1221	1432	1444	2112	3024	3564	3154	2659	2180	1967	2358	26379
Average Volume (m ³ /d)	41	42	46	48	68	101	115	102	89	70	66	76	72
Maximum Volume (m ³ /d)	52	50	55	55	205	177	142	163	127	85	76	99	205
MDWL - Rated Capacity (m ³ /day)	561	561	561	561	561	561	561	561	561	561	561	561	561

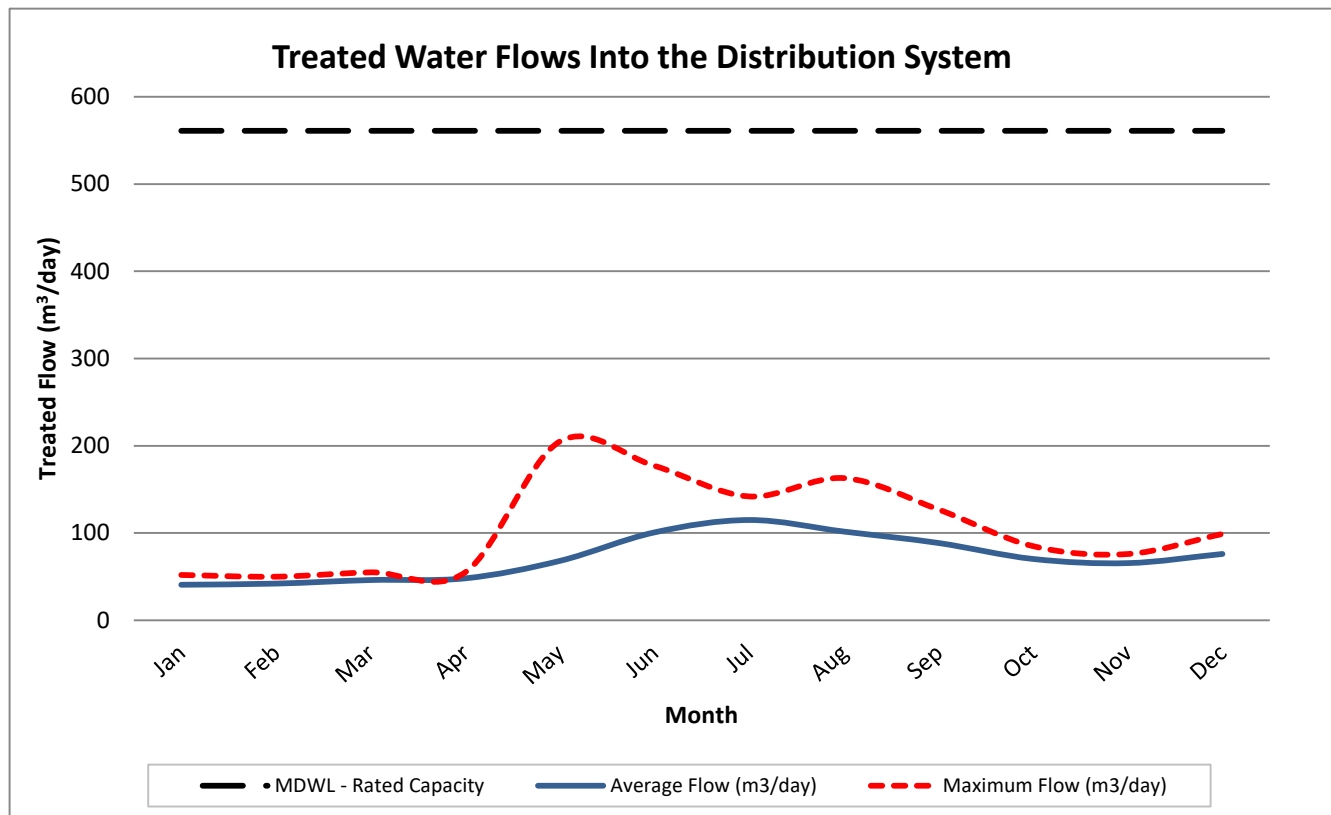
Schedule C, Section 1.0 (1.1) of MDWL No. 271-101 states that the maximum daily volume of treated water that flows from the treatment subsystem to the distribution system shall not exceed 561 m³/day. The Charlton DWS complied with this limit having a recorded maximum volume of 205 m³/day on June 27th during distribution flushing. This represents 36.5% of the rated capacity.



Figure 1 compares the average and maximum flow rates into the distribution system to the rated capacity of the system identified in the MDWL.

Figure 1: 2020 - Comparison of Treated Water Flows to the Rated Capacity

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average Flow (m ³ /day)	41	42	46	48	68	101	115	102	89	70	66	76
Maximum Flow (m ³ /day)	52	50	55	55	205	177	142	163	127	85	76	99
MDWL - Rated Capacity	561	561	561	561	561	561	561	561	561	561	561	561
% Rated Capacity	9	9	10	10	37	32	25	29	23	15	14	18



Summary of System Performance

The following information is provided to enable the Owner to assess the capability of the system to meet existing and future water usage needs.

Rated Capacity of the Plant (MDWL)	561 m ³ /day	
Average Daily Flow for 2020	72 m ³ /day	12.8 % of the rated capacity
Maximum Daily Flow for 2020	205 m ³ /day	36.5 % of the rated capacity
Total Treated Water Produced in 2020	36,379 m ³	

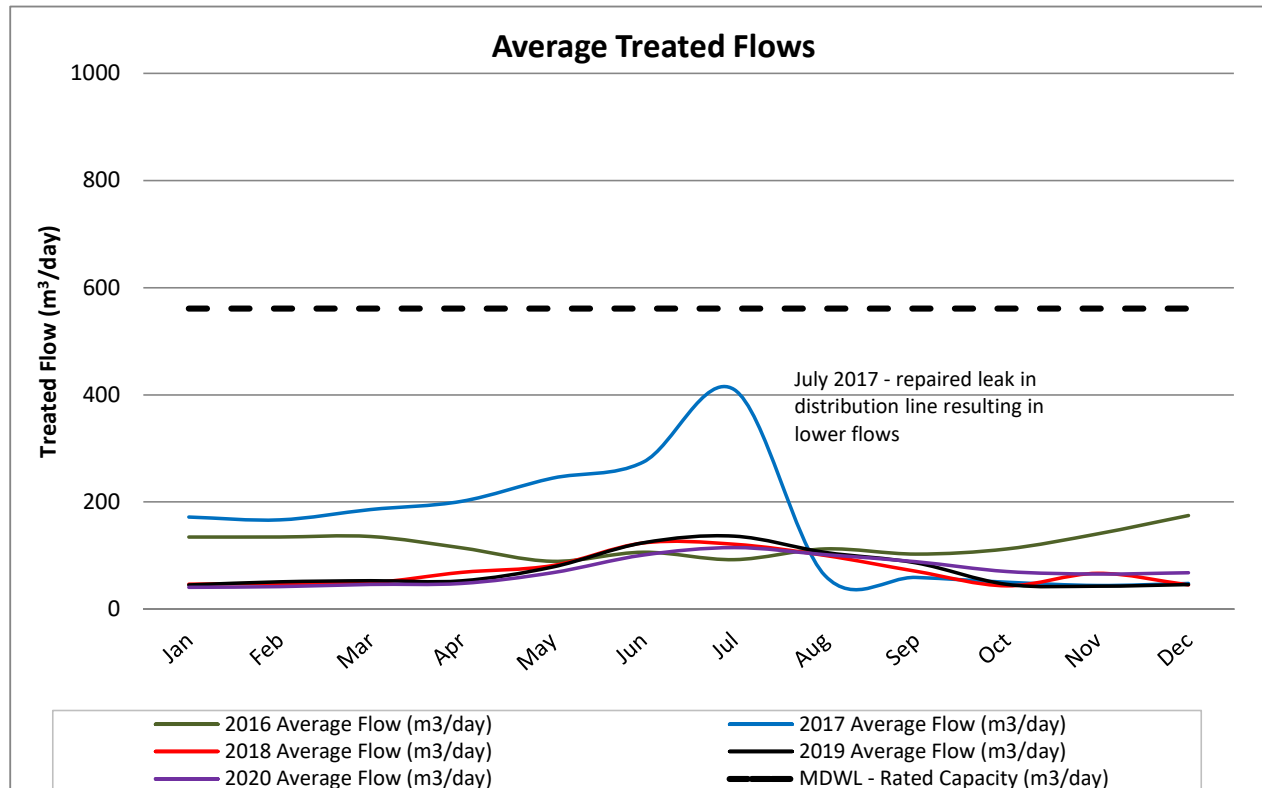
Historical Flows

Year	Maximum Treated Flow (m³/d)	Average Daily Treated Flow (m³/d)	Average Day % of Rated Capacity (561 m³/d)
2020	205	72	12.8%
2019	234	72	12.8%
2018	234	72	12.8%
2017	508	160	28.5%
2016	189	121	21.6%

Figure 2 compares the average treated water flows from 2016 to 2020.

Figure 2 - Historical Water Usage Trends (2016 to 2020)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2016 Average Flow (m ³ /day)	135	135	136	114	89	106	92	112	103	112	141	175
2017 Average Flow (m ³ /day)	172	167	186	201	244	275	410	63	59	50	44	48
2018 Average Flow (m ³ /day)	47	48	49	69	81	124	121	100	71	44	67	45
2019 Average Flow (m ³ /day)	45	51	53	53	79	124	136	106	87	46	43	46
2020 Average Flow (m ³ /day)	41	42	46	48	68	101	115	102	89	70	66	68
MDWL - Rated Capacity (m ³ /day)	561	561	561	561	561	561	561	561	561	561	561	561





CONCLUSION

The water quality data collected in 2020 demonstrates that the Charlton drinking water system provided high quality drinking water to its users. During the operation of the water treatment system in 2020, there was one adverse water quality incident. The sodium level in the treated water was above the reportable standard of 20 mg/L. The adverse sodium result was reported to the Ministry's Spills Action Center and the local Health Units as required under Schedule 16 of O. Reg. 170/03.

One non-compliance also occurred during the reporting period. The system provides chloramination as secondary disinfection and failed to meet the regulatory limit for combined chlorine residual one day during the reporting period, but met the regulatory limit for free chlorine during that time.

The Charlton Drinking Water System was able to operate in accordance with the terms and conditions of the Permit to Take Water and in accordance with the rated capacity of the licence while meeting the community's demand for water use.



APPENDIX A

Monthly Summary of Microbiological
Test Results

**CHARLTON DRINKING WATER SYSTEM
2020 SUMMARY OF MICROBIOLOGICAL TEST RESULTS**

Facility Works Number: 220005768
 Municipality: Municipality of Charlton and Dack
 Facility Owner:
 Facility Classification: Class 2 Water Treatment

RAW WATER	01/2020	02/2020	03/2020	04/2020	05/2020	06/2020	07/2020	08/2020	09/2020	10/2020	11/2020	12/2020	Total	Avg	Max	Min
Englehart River / Total Coliform: TC - cfu/100mL																
Count Lab	4	4	5	4	4	5	4	5	4	4	5	4	52			
Max Lab	122	122	230	685	240	560	105	25	125	210	585	< 56			685	
Mean Lab	88	80.5	154.2	391.5	164	136	67.5	13.8	46.25	141.5	315.2	< 36.5	<	137.673		
Min Lab	54	46	85	76	50	8	10	5	2	86	162	< 2			<	2
Englehart River / E. Coli: EC - cfu/100mL																
Count Lab	4	4	5	4	4	5	4	5	4	4	5	4	52			
Max Lab	< 2	< 2	4	< 8	< 2	< 5	< 5	5	40	10	8	< 2			40	
Mean Lab	< 2	< 2	< 2.4	< 3.5	< 2	< 3.4	< 3.5	< 3.2	< 12	6	< 5.4	< 2	<	3.923		
Min Lab	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	4	4	< 2			<	2
TREATED WATER	01/2020	02/2020	03/2020	04/2020	05/2020	06/2020	07/2020	08/2020	09/2020	10/2020	11/2020	12/2020	Total	Avg	Max	Min
Treated Water (POE) / Total Coliform: TC - cfu/100mL																
Count Lab	4	4	5	4	4	5	4	5	4	4	5	4	52			
Max Lab	0	0	0	0	0	0	0	0	0	0	0	0			0	
Mean Lab	0	0	0	0	0	0	0	0	0	0	0	0		0		
Min Lab	0	0	0	0	0	0	0	0	0	0	0	0				0
Treated Water (POE) / E. Coli: EC - cfu/100mL																
Count Lab	4	4	5	4	4	5	4	5	4	4	5	4	52			
Max Lab	0	0	0	0	0	0	0	0	0	0	0	0			0	
Mean Lab	0	0	0	0	0	0	0	0	0	0	0	0		0		
Min Lab	0	0	0	0	0	0	0	0	0	0	0	0				0
Treated Water (POE) / HPC - cfu/mL																
Count Lab	4	4	5	4	4	5	4	5	4	4	5	4	52			
Max Lab	< 10	< 10	< 10	< 10	< 30	< 30	< 10	< 100	< 10	< 10	< 10	< 10			100	
Mean Lab	< 10	< 10	< 10	< 10	< 17.5	< 18	< 10	< 28	< 10	< 10	< 10	< 10	<	13.077		
Min Lab	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10			<	10
DISTRIBUTION WATER	01/2020	02/2020	03/2020	04/2020	05/2020	06/2020	07/2020	08/2020	09/2020	10/2020	11/2020	12/2020	Total	Avg	Max	Min
C-3 (Bacti) / Total Coliform: TC - cfu/100mL																
Count Lab	4	4	5	4	4	5	4	5	4	4	5	4	52			
Max Lab	0	0	0	0	0	0	0	0	0	0	0	0			0	
Mean Lab	0	0	0	0	0	0	0	0	0	0	0	0		0		
Min Lab	0	0	0	0	0	0	0	0	0	0	0	0				0
C-3 (Bacti) / E. Coli: cfu/100mL																
Count Lab	4	4	5	4	4	5	4	5	4	4	5	4	52			
Max Lab	0	0	0	0	0	0	0	0	0	0	0	0			0	
Mean Lab	0	0	0	0	0	0	0	0	0	0	0	0		0		
Min Lab	0	0	0	0	0	0	0	0	0	0	0	0				0
C-3 (Bacti) / HPC - cfu/mL																
Count Lab	2	2	2	2	3	2	1	3	1	2	3	2	25			
Max Lab	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	140	< 10	< 10	< 10			140	
Mean Lab	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	140	< 10	< 10	< 10	<	15.2		
Min Lab	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	140	< 10	< 10	< 10			<	10
C-4 (Bacti) / Total Coliform: TC - cfu/100mL																
Count Lab	4	4	5	4	4	5	4	5	4	4	5	4	52			
Max Lab	0	0	0	0	0	0	0	0	0	0	0	0			0	
Mean Lab	0	0	0	0	0	0	0	0	0	0	0	0		0		
Min Lab	0	0	0	0	0	0	0	0	0	0	0	0				0
C-4 (Bacti) / E. Coli: cfu/100mL																
Count Lab	4	4	5	4	4	5	4	5	4	4	5	4	52			
Max Lab	0	0	0	0	0	0	0	0	0	0	0	0			0	
Mean Lab	0	0	0	0	0	0	0	0	0	0	0	0		0		
Min Lab	0	0	0	0	0	0	0	0	0	0	0	0				0
C-4 (Bacti) / HPC - cfu/mL																
Count Lab	2	2	3	2	1	3	3	2	3	2	2	2	27			
Max Lab	< 10	< 10	< 20	< 10	< 10	< 10	30	< 20	< 10	30	20	50			50	
Mean Lab	< 10	< 10	< 13.333	< 10	< 10	< 10	< 16.667	< 15	< 10	20	< 15	35	<	14.444		
Min Lab	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	10	< 10	20			<	10



APPENDIX B

Monthly Summary of Operational Data

**CHARLTON DRINKING WATER SYSTEM
2020 SUMMARY OF OPERATIONAL RESULTS**

Facility Works Number: 220005768
 Facility Owner: Municipality of Charlton and Dack
 Facility Classification: Class 2 Water Treatment

	01/2020	02/2020	03/2020	04/2020	05/2020	06/2020	07/2020	08/2020	09/2020	10/2020	11/2020	12/2020	Total	Avg	Max	Min
FILTERED WATER																
Filtration / Turbidity (1 NTU) - NTU																
Max OL	1.999	1.157	1.999	1.997	1.601	0.513	1.999	0.185	1.999	0.753	0.866	0.97			1.999	
Mean OL	0.063	0.033	0.028	0.06	0.049	0.051	0.048	0.049	0.059	0.051	0.056	0.064		0.051		
Min OL	0.00	0.01	0.00	0.00	0.03	0.035	0.00	0.032	0.034	0.035	0.036	0.037				0.00
TREATED WATER																
Contact Chamber / Cl Residual: Free (0.90 W/0.40 S) - mg/L																
Max OL	4.725	3.125	4.707	3.692	2.426	1.959	4.714	3.112	4.705	2.418	2.366	2.333			4.725	
Mean OL	1.806	1.958	1.659	1.715	1.765	1.595	1.54	1.633	1.636	1.833	1.911	1.698		1.729		
Min OL	1.224	1.218	0.862	0.97	0.911	1.037	0.994	0.865	0.92	1.053	0.88	1.372				0.862
DISTRIBUTION WATER																
Residual No. 1 / Cl Residual: Combined - mg/L																
Count IH	9	8	9	9	8	9	9	9	8	8	9	9	104			
Max IH	2.01	1.98	2.1	2.11	1.9	1.76	1.63	1.99	1.53	2.06	2.01	2.17			2.17	
Mean IH	1.709	1.78	1.774	1.639	1.67	1.474	1.452	1.573	1.396	1.634	1.636	1.658		1.616		
Min IH	1.31	1.58	1.28	1	1.38	1.24	1.24	1.03	1.28	1.29	1.31	0.85				0.85
Residual No. 2 / Cl Residual: Combined - mg/L																
Count IH	9	8	9	9	8	9	9	9	8	8	9	9	104			
Max IH	2.13	2.05	1.92	1.83	2.02	1.72	1.75	2.18	1.45	2	2.1	2.26			2.26	
Mean IH	1.86	1.899	1.778	1.31	1.775	1.53	1.527	1.387	1.278	1.731	1.792	1.821		1.639		
Min IH	1.51	1.65	1.38	0.51	1.32	1.27	1.38	0.22	1.03	1.25	1.41	1.6				0.22
Residual No. 3 / Cl Residual: Combined - mg/L																
Count IH	9	8	9	9	8	9	9	9	8	8	9	9	104			
Max IH	2.09	2.07	1.94	2.02	2.02	1.69	1.67	2.1	1.21	2.41	2.11	1.9			2.41	
Mean IH	1.791	1.881	1.824	1.46	1.69	1.409	1.423	1.592	1.05	1.706	1.872	1.713		1.619		
Min IH	1.35	1.51	1.66	0.8	1.39	0.9	1.15	1.15	0.73	0.86	1.46	1.52				0.73
Residual No. 4 / Cl Residual: Combined - mg/L																
Count IH	4	4	5	4	4	5	4	5	4	4	5	4	52			
Max IH	1.98	1.67	1.9	1.78	2.07	1.66	1.39	2.12	1.17	1.75	2.06	1.73			2.12	
Mean IH	1.758	1.458	1.734	1.363	1.698	1.276	1.085	1.632	1.095	1.422	1.524	1.403		1.461		
Min IH	1.53	1.3	1.49	0.92	1.41	0.85	0.33	1.17	0.92	0.94	1.05	0.9				0.33

NOTES:

- The Charlton water treatment process automatically shuts down if the filter effluent turbidity reaches 0.8 NTU after 72 seconds or 4 minutes after a backwash. In 2020, the system shutdown during all high turbidity events.
- CT is the concentration of chlorine in the water times the time of contact that the chlorine has with the water. It is used to demonstrate the level of disinfection treatment in the water. CT calculations are performed for the Charlton water plant if the free chlorine residual level drops below 0.90 mg/L in winter months and 0.40 mg/L in summer months to ensure primary disinfection is achieved.

March 22, November 20 and November 21 - low treated water free chlorine residual results (<0.9 mg/L) . CT calculations performed and passed.