



Ontario Clean Water Agency
Agence Ontarienne Des Eaux

Charlton Drinking Water System

2019 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.

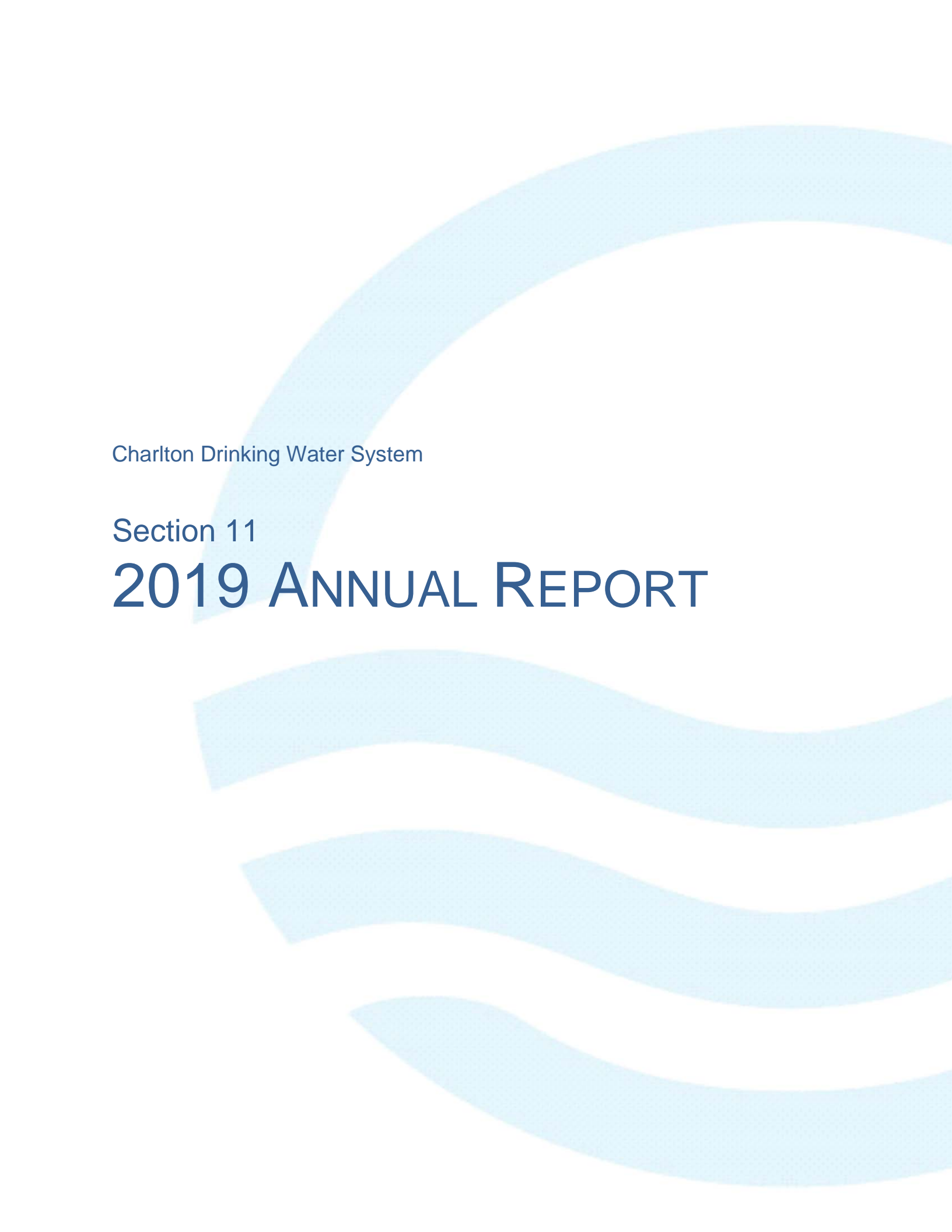
The report must list the requirements of the Act, its regulations, the system's Drinking Water Works Permit (DWWP), Municipal Drinking Water Licence (MDWL), Certificate of Approval (if applicable), and any regulatory requirements the system failed to meet during the reporting period. The report must 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 2019 Annual/Summary Report.



Charlton Drinking Water System

Section 11

2019 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, 2019 to December 31, 2019

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 2019 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:

- 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 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. 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. Ammonium sulphate is added at the discharge of the chlorine contact tank to produce a combined chlorine residual before entering the distribution system.

There are three high lift pumps each rated at 4.85 L/s that can direct water to the distribution system. Variable frequency drive units were installed on the two pumps located in the clearwell. High lift pump #1 is not in service because it is located in the chlorine contact tank. Water pumped from this location does not meet chlorine contact time (CT) requirements. A hydro-pneumatic tank having a volume of 1500 L provides pressure to the distribution system. The treated water is monitored for total and free 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 settling tank with a sludge pump that



transfers sludge to a tanker truck for disposal. The supernatant is discharged by an effluent weir to the Englehart River. Composite samples of the effluent are collected using an autosampler.

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 117 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 one Depolox 3 chlorine analyzer with a Depolox 3 Plus chlorine analyzer which continuously measures free chlorine, pH and temperature.
- Replaced a Prominent alum metering pump with an upgraded version of a Prominent (Gamma X) metering pump capable of shutting down during pump failures/faults or instances of no chemical flow.

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, no adverse water quality incidents were reported to the Ministry's Spills Action Centre in 2019.

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 (River)	53	<2 to 30	<2 to 400	0	N/A
Treated	53	0 to 0	0 to 0	53	< 10 to 800
Distribution	106	0 to 0	0 to 0	53	< 10 to 20

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

MAC for Total Coliforms = 0 Counts/100 mL

NDOGT = No Data, Overgrown with Target

NDOGN = No Data, Overgrown with Non-target

"<" 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 are 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 2.00 ^{Note 2}	NTU	≤ 1.0 (for >15 min)
Free Chlorine (contact chamber)	8760	0.591 ^{Note 3} to 4.72	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 140 seconds or 4 minutes after a backwash. In 2019, 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.

January 14, March 23, May 6, May 26 - low treated water free chlorine residual results were observed (<0.90 mg/L) . CT calculations performed and passed, meaning the system was providing proper disinfection.

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	367	0.48 to 2.41	mg/L	≥ 0.25

Note: 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.

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 8	0.09	< 0.008	mg/L	No
April 4	<0.05	< 0.05	mg/L	No
July 10	<0.05	< 0.05	mg/L	No
October 9	<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 8	72.1	ug/L		
February 14	67.4	ug/L		
March 20	50.0	ug/L		
April 4	55.4	ug/L	67.6	No
July 10	72.5	ug/L		
October 9	79.4	ug/L		

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

Haloacetic Acid (HAAs) Sampling and Testing Required under Schedule 13-6.1

New sampling requirements for Haloacetic Acids (HAAs) came into effect on January 1st, 2017. At least one distribution sample must be taken in each calendar quarter, from a point in the drinking water system’s distribution system, or plumbing that is likely to have an elevated potential for the formation of HAAs. Over the past three years, samples were collected near the plant, in the middle of the distribution system and at the end of the distribution system as per guidance provided in a Ministry’s letter “HAA Concerns” dated May 9, 2018. The sample

locations with the highest concentrations of HAAs are the Heritage Center (26 Bay St.) in the middle of the system and the Gospel Hall (Howie St.) at the end of the system.

The maximum allowable concentration (MAC) of 80 ug/L is effective January 1st, 2020 and is based on a running annual average of quarterly results (similar to THMs). Results that exceed the MAC must be reported as an adverse water quality incident (AWQI) starting January 1st, 2020. HAA results for 2019 are summarized below.

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 8	143	ug/L		
February 14	73	ug/L		
March 20	23	ug/L	69.4	N/A
April 4	52	ug/L		
July 10	64	ug/L		
October 9	82	ug/L		

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 alkalinity and pH testing were carried out on March 28th and September 23rd of 2019. 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 28	1	7.25	5.7	123	N/A
September 23	1	7.66	11	116	N/A

Note: Next lead sampling scheduled for 2020

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	ug/L	10	No	No
Barium	9	ug/L	1000	No	No
Boron	8	ug/L	5000	No	No
Cadmium	< 0.1	ug/L	5	No	No
Chromium	2	ug/L	50	No	No
Mercury	< 0.1	ug/L	1	No	No
Selenium	< 0.5	ug/L	50	No	No
Uranium	< 1	ug/L	20	No	No

Note: Sample required every 12 months (sample date = October 9, 2019)

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	< 0.229	ug/L	5	No	No
Atrazine + N-dealkylated metabolites	< 0.5	ug/L	5	No	No
Azinphos-methyl	< 0.172	ug/L	20	No	No
Benzene	< 0.1	ug/L	1	No	No
Benzo(a)pyrene	< 0.009	ug/L	0.01	No	No
Bromoxynil	< 0.0922	ug/L	5	No	No
Carbaryl	< 1	ug/L	90	No	No
Carbofuran	< 2	ug/L	90	No	No
Carbon Tetrachloride	< 0.2	ug/L	2	No	No
Chlorpyrifos	< 0.172	ug/L	90	No	No
Diazinon	< 0.172	ug/L	20	No	No
Dicamba	< 0.138	ug/L	120	No	No
1,2-Dichlorobenzene	< 0.2	ug/L	200	No	No
1,4-Dichlorobenzene	< 0.3	ug/L	5	No	No
1,2-Dichloroethane	< 0.2	ug/L	5	No	No
1,1-Dichloroethylene (vinylidene chloride)	< 0.3	ug/L	14	No	No
Dichloromethane	< 1	ug/L	50	No	No
2-4 Dichlorophenol	< 0.2	ug/L	900	No	No
2,4-Dichlorophenoxy acetic acid (2,4-D)	< 0.346	ug/L	100	No	No
Diclofop-methyl	< 0.115	ug/L	9	No	No
Dimethoate	< 0.172	ug/L	20	No	No
Diquat	< 0.2	ug/L	70	No	No
Diuron	< 6	ug/L	150	No	No
Glyphosate	< 20	ug/L	280	No	No
MCPA	< 5.76	ug/L	100	No	No
Malathion	< 0.172	ug/L	190	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
Metolachlor	< 0.115	ug/L	50	No	No
Metribuzin	< 0.115	ug/L	80	No	No
Monochlorobenzene	< 0.5	ug/L	80	No	No
Paraquat	< 0.1	ug/L	10	No	No
Pentachlorophenol	< 0.3	ug/L	60	No	No
Phorate	< 0.115	ug/L	2	No	No
Picloram	< 0.0807	ug/L	190	No	No
Polychlorinated Biphenyls (PCBs)	< 0.06	ug/L	3	No	No
Prometryne	< 0.0574	ug/L	1	No	No
Simazine	< 0.172	ug/L	10	No	No
Terbufos	< 0.115	ug/L	1	No	No
Tetrachloroethylene	< 0.2	ug/L	10	No	No
2,3,4,6-Tetrachlorophenol	< 0.3	ug/L	100	No	No
Triallate	< 0.115	ug/L	230	No	No
Trichloroethylene	< 0.2	ug/L	50	No	No
2,4,6-Trichlorophenol	< 0.2	ug/L	5	No	No
Trifluralin	< 0.115	ug/L	45	No	No
Vinyl Chloride	< 0.1	ug/L	1	No	No

Note: Sample required every 12 months (sample date = October 9, 2019)

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, 2015	1	21.9	mg/L	20	Yes
October 13, 2015 (resample)	1	23.1	mg/L	20	Yes

Note: Sample required every 60 months. Next sampling scheduled for October 2020

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 MOE SAC and the Timiskaming Health Unit on October 8, 2015 as required under Schedule 16 of O. Reg. 170/03 (AWQI# 126794).

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, 2015	1	< 0.1	mg/L	1.5	No

Note: Sample required every 60 months. Next sampling scheduled for October 2020

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 2019.

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 8	1	3			
February 4	1	7			
March 4	1	17.5			
April 1	1	6.5			
May 6	1	9.5			
June 3	1	11			
July 2	1	10.5	mg/L	16.0	≤ 25
August 6	1	10.5			
September 3	1	1			
October 3	1	69			
October 7	1	2.5			
November 4	1	4.5			
December 9	1	40			



Charlton Drinking Water System

Schedule 22

2019 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, 2019 to December 31, 2019

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 requirements during the 2019 reporting period:

Drinking Water Legislation	Requirement(s) the System Failed to Meet	Duration	Corrective Action(s)	Status
Ontario Regulation 170/03; Schedule 7-2(4)	<p>Four distribution samples are to be collected on one day at the beginning of the week and tested for combined chlorine residuals (CCRs). Three distribution samples are to be collected on a second day of the week and tested for CCRs, at least 48 hours after the last sample mentioned above.</p> <p>On Monday, December 30th, four distribution samples were to be collected and tested for CCR, but only three samples were taken and tested.</p>	Week of December 30, 2019	<p>All operators were made aware of the incident and reminded of the requirements of the regulation during a meeting that took place on Thursday, January 16, 2020.</p> <p>The on-call operator will review and sign-off the <i>Distribution Chlorine Residual Sheet</i> every Thursday afternoon before the end of the shift to ensure all distribution chlorine residuals were collected and tested.</p>	Complete

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 2019 reporting period, including total monthly volumes, average monthly volumes, maximum monthly volumes, and maximum flow rates.

Raw Water

2019 - Monthly Summary of Water Takings from the Source (Englehart River)

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

	<i>Jan</i>	<i>Feb</i>	<i>Mar</i>	<i>Apr</i>	<i>May</i>	<i>Jun</i>	<i>Jul</i>	<i>Aug</i>	<i>Sep</i>	<i>Oct</i>	<i>Nov</i>	<i>Dec</i>	<i>Year to Date</i>
<i>Total Volume (m³)</i>	1808	1772	2052	1971	2844	4548	5247	3906	3084	1872	1578	1782	32464
<i>Average Volume (m³/d)</i>	58	63	66	66	92	152	169	126	103	60	53	57	89
<i>Maximum Volume (m³/d)</i>	83	76	85	80	139	241	234	189	150	100	78	114	241
<i>PTTW - Maximum Allowable Volume (m³/day)</i>	842	842	842	842	842	842	842	842	842	842	842	842	842
<i>Maximum Flow Rate (L/min)</i>	195	196	187	188	183	189	196	194	197	197	183	193	197
<i>PTTW - Maximum Allowable Flow Rate (L/min)</i>	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

2019 - 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

	<i>Jan</i>	<i>Feb</i>	<i>Mar</i>	<i>Apr</i>	<i>May</i>	<i>Jun</i>	<i>Jul</i>	<i>Aug</i>	<i>Sep</i>	<i>Oct</i>	<i>Nov</i>	<i>Dec</i>	<i>Year to Date</i>
<i>Total Volume (m³)</i>	1401	1429	1646	1587	2436	3716	4225	3286	2595	1437	1287	1423	26468
<i>Average Volume (m³/d)</i>	45	51	53	53	79	124	136	106	87	46	43	46	72
<i>Maximum Volume (m³/d)</i>	57	58	60	63	106	234	190	152	115	89	64	59	234
<i>MDWL - Rated Capacity (m³/day)</i>	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

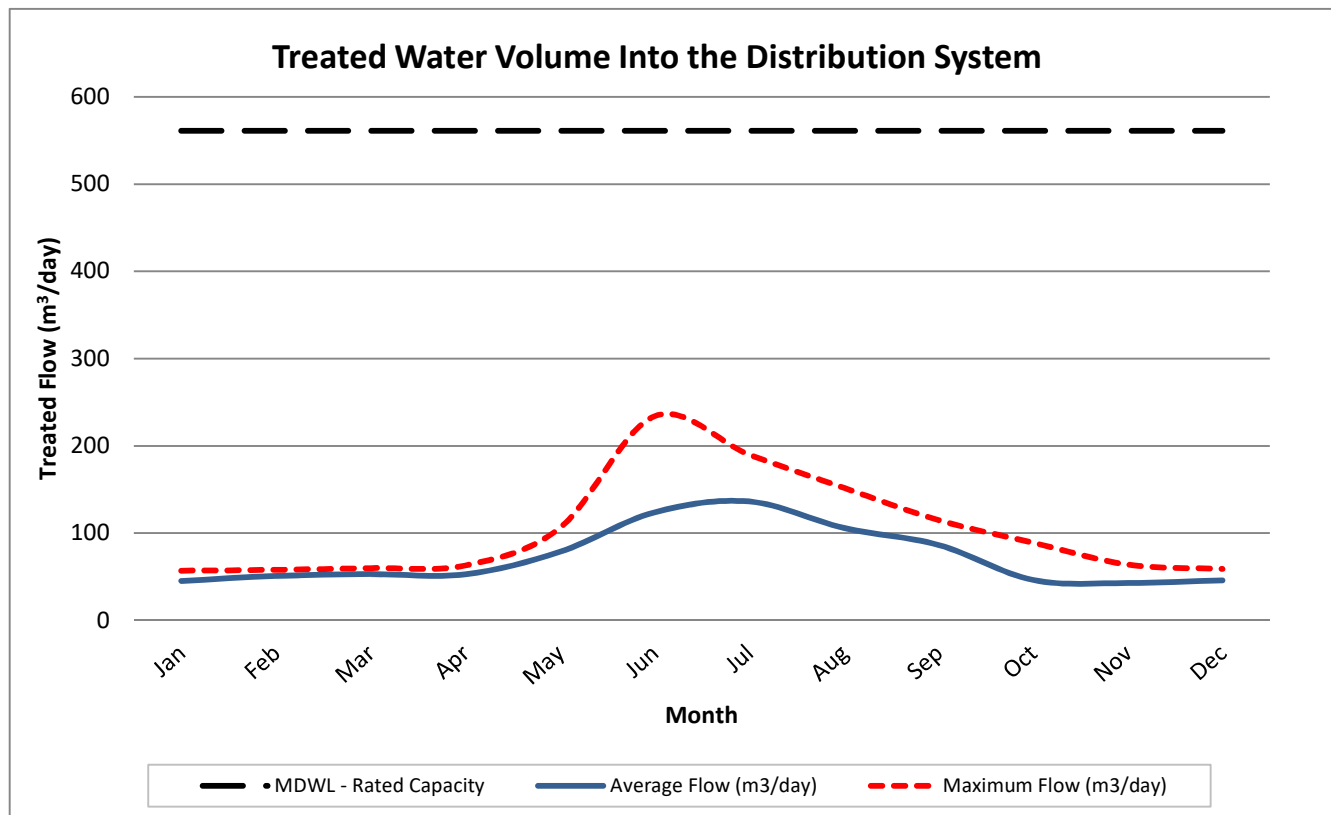


exceed 561 m³/day. The Charlton DWS complied with this limit having a recorded maximum volume of 234 m³/day in June, which represents 41.7% of the rated capacity.

The following table and graph (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: 2019 - Monthly Volume of Treated Water into the Distribution System

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average Flow (m ³ /day)	45	51	53	53	79	124	136	106	87	46	43	46
Maximum Flow (m ³ /day)	57	58	60	63	106	234	190	152	115	89	64	59
MDWL - Rated Capacity	561	561	561	561	561	561	561	561	561	561	561	561
% Rated Capacity	10	10	11	11	19	42	34	27	20	16	11	11



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 2019	72 m ³ /day	12.8 % of the rated capacity
Maximum Daily Flow for 2019	234 m ³ /day	41.7 % of the rated capacity
Total Treated Water Produced in 2019	36,468 m ³	

CONCLUSION

The Charlton Drinking Water System operated well in 2019 meeting the terms and conditions outlined in its site specific drinking water works permit and municipal drinking water licence.

The system was able to operate within the water taking limits of the permit and in accordance with the rated capacity of the licence while meeting the community's demand for water use.

The system addressed the following non-compliance with the regulatory requirements of the Safe Drinking Water Act and its Regulations:

Four distribution samples are to be collected on one day at the beginning of the week and tested for combined chlorine residuals (CCRs). Three distribution samples are to be collected on a second day of the week and tested for CCRs, at least 48 hours after the last sample was collected on the first day.

Operations failed to collect and test the required number of distribution combined chlorine residuals (CCRs) during the week of December 30th. Four distribution samples were to be collected and tested for CCR on Monday, December 30th, but only three samples were taken and tested. All operators were made aware of the incident and reminded of the requirements of the regulation and a weekly check was implemented to ensure all samples are collected and tested.



APPENDIX A

Monthly Summary of Microbiological
Test Results

**CHARLTON DRINKING WATER SYSTEM
2019 SUMMARY OF MICROBIOLOGICAL TEST RESULTS**

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

RAW WATER	01/2019	02/2019	03/2019	04/2019	05/2019	06/2019	07/2019	08/2019	09/2019	10/2019	11/2019	12/2019	Total	Avg	Max	Min
Englehart River / E. Coli: EC - cfu/100mL																
Count Lab	5	4	4	5	4	4	5	4	5	4	4	5	53			
Max Lab	< 2	< 2	< 2	8	6	6	< 2	< 5	30	8	< 4	< 2			30	
Mean Lab	< 2	< 2	< 2	< 3.6	3.5	< 4	< 2	< 3.5	9.6	4.5	< 2.5	< 2		< 3.462		
Min Lab	< 2	< 2	< 2	< 2	2	< 2	< 2	< 2	2	2	< 2	< 2				< 2
Englehart River / Total Coliform: TC - cfu/100mL																
Count Lab	5	4	4	5	4	4	5	4	5	4	4	5	53			
Max Lab	176	86	200	> 400	> 400	72	< 16	< 5	310	254	288	208			400	
Mean Lab	92.8	69	130	> 257.8	> 227	40	< 8	< 3.5	94	205	180.5	154.4		> 123.365		
Min Lab	6	24	64	> 84	80	24	< 2	< 2	10	130	8	98				< 2

TREATED WATER	01/2019	02/2019	03/2019	04/2019	05/2019	06/2019	07/2019	08/2019	09/2019	10/2019	11/2019	12/2019	Total	Avg	Max	Min
Treated Water (POE) / Total Coliform: TC - cfu/100mL																
Count Lab	5	4	4	5	4	4	5	4	5	4	4	5	53			
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	5	4	4	5	4	4	5	4	5	4	4	5	53			
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	5	4	4	5	4	4	5	4	5	4	4	5	53			
Max Lab	< 10	< 10	< 10	< 10	170	< 10	< 10	20	< 230	< 10	800	< 10			800	
Mean Lab	< 10	< 10	< 10	< 10	77.5	< 10	< 10	< 12.5	< 54	< 10	< 207.5	< 10		< 34.34		
Min Lab	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10				< 10

DISTRIBUTION WATER	01/2019	02/2019	03/2019	04/2019	05/2019	06/2019	07/2019	08/2019	09/2019	10/2019	11/2019	12/2019	Total	Avg	Max	Min
C-3 (Bacti) / Total Coliform: TC - cfu/100mL																
Count Lab	5	4	4	5	4	4	5	4	5	4	4	5	53			
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: EC - cfu/100mL																
Count Lab	5	4	4	5	4	4	5	4	5	4	4	5	53			
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	3	2	2	2	2	3	2	2	2	2	3	27			
Max Lab	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10			10	
Mean Lab	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10		< 10		
Min Lab	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10				< 10
C-4 (Bacti) / Total Coliform: TC - cfu/100mL																
Count Lab	5	4	4	5	4	4	5	4	5	4	4	5	53			
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: EC - cfu/100mL																
Count Lab	5	4	4	5	4	4	5	4	5	4	4	5	53			
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	3	1	2	3	2	2	2	2	3	2	2	2	26			
Max Lab	< 10	< 10	< 10	< 10	< 10	< 10	< 10	20	< 10	< 10	< 10	< 10			20	
Mean Lab	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 15	< 10	< 10	< 10	< 10		< 10.385		
Min Lab	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10				< 10



APPENDIX B

Monthly Summary of Operational Data

**CHARLTON DRINKING WATER SYSTEM
2019 SUMMARY OF OPERATIONAL RESULTS**

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

FILTERED WATER	01/2019	02/2019	03/2019	04/2019	05/2019	06/2019	07/2019	08/2019	09/2019	10/2019	11/2019	12/2019	Total	Avg	Max	Min
Filtration / Turbidity (1 NTU) - NTU																
Max OL	0.496	0.718	0.63	0.61	0.687	0.804	1.727	2.00	0.544	1.999	1.999	1.999			2.00	
Mean OL	0.049	0.049	0.05	0.055	0.049	0.052	0.073	0.066	0.039	0.059	0.065	0.071		0.056		
Min OL	0.00	0.032	0.031	0.03	0.031	0.027	0.036	0.022	0.015	0.015	0.036	0.032				0.00

TREATED WATER	01/2019	02/2019	03/2019	04/2019	05/2019	06/2019	07/2019	08/2019	09/2019	10/2019	11/2019	12/2019	Total	Avg	Max	Min
Contact Chamber / CI Residual: Free (0.90 W/0.40 S) - mg/L																
Max OL	4.564	2.086	4.701	3.007	3.688	2.745	4.724	4.723	4.702	2.506	2.637	4.705			4.724	
Mean OL	1.64	1.519	1.576	1.783	1.601	1.768	1.623	1.729	1.836	1.916	1.963	2.002		1.746		
Min OL	0.847	1.14	0.591	0.955	0.77	0.844	0.86	0.935	1.056	1.276	1.34	1.249				0.591

DISTRIBUTION WATER	01/2019	02/2019	03/2019	04/2019	05/2019	06/2019	07/2019	08/2019	09/2019	10/2019	11/2019	12/2019	Total	Avg	Max	Min
Residual No. 1 / CI Residual: Combined - mg/L																
Count IH	10	8	8	9	9	8	9	9	9	9	8	9	105			
Total IH	12.15	12.58	11.3	13.78	11.98	12.93	13.66	14.67	13.26	12.42	13.64	16.48	158.85			
Max IH	1.5	2	1.93	1.81	1.65	2.03	1.88	2.06	1.76	1.71	1.89	2.16			2.16	
Mean IH	1.215	1.573	1.412	1.531	1.331	1.616	1.518	1.63	1.473	1.38	1.705	1.831		1.513		
Min IH	0.83	1.4	1.11	1.18	0.99	1.33	1.28	1.32	0.94	1.11	1.16	1.28				0.83
Residual No. 2 / CI Residual: Combined - mg/L																
Count IH	10	8	8	9	9	8	9	9	9	9	8	9	105			
Total IH	14.17	13.23	12.109	14.08	12.46	12.99	14.6	15.31	14.62	14.43	15.36	17.58	170.939			
Max IH	1.9	2.03	2.14	1.92	1.63	2.08	2.01	2.05	2.01	1.79	2.13	2.15			2.15	
Mean IH	1.417	1.654	1.514	1.564	1.384	1.624	1.622	1.701	1.624	1.603	1.92	1.953		1.628		
Min IH	1.12	1.42	1.149	1.04	1.11	1.32	1.34	1.36	1.25	1.42	1.68	1.63				1.04
Residual No. 3 / CI Residual: Combined - mg/L																
Count IH	10	8	8	9	9	8	9	9	9	9	8	9	105			
Total IH	13.11	13.14	12.61	13.48	11.97	11.93	14.11	16.38	14.07	12.92	14.88	18.11	166.71			
Max IH	1.92	2.02	2.13	1.78	1.7	1.95	2.14	2.12	1.95	1.82	2.11	2.18			2.18	
Mean IH	1.311	1.642	1.576	1.498	1.33	1.491	1.568	1.82	1.563	1.436	1.86	2.012		1.588		
Min IH	0.84	1.42	1.21	0.91	0.87	1.23	1.23	1.44	1.23	1.1	1.65	1.78				0.84
Residual No. 4 / CI Residual: Combined - mg/L																
Count IH	5	4	4	5	4	4	5	4	5	4	4	4	52			
Total IH	5.84	6.57	5.35	6.94	5.22	7.69	7.34	6.75	6.64	5.19	6.69	7.25	77.47			
Max IH	1.33	1.88	1.43	1.86	1.42	2.41	2.04	1.86	1.48	1.47	1.9	1.88			2.41	
Mean IH	1.168	1.643	1.338	1.388	1.305	1.923	1.468	1.688	1.328	1.298	1.672	1.813		1.49		
Min IH	1.05	1.5	1.26	1.06	1.2	1.33	0.48	1.4	1.08	0.95	1.45	1.76				0.48

NOTES:

- The Charlton water treatment process automatically shuts down if the filter effluent turbidity reaches 0.8 NTU after 140 seconds or 4 minutes after a backwash. In 2019, 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.

January 14, March 23, May 6, May 26 - low treated water free chlorine residual results (<0.9 mg/L) . CT calculation performed and passed.