



**Ontario Clean Water Agency**  
**Agence Ontarienne Des Eaux**

Charlton Drinking Water System

# 2016 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 31<sup>st</sup> 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 Provincial Officer Order 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 2016 Annual/Summary Report.



Charlton Drinking Water System

Section 11

# 2016 ANNUAL REPORT



## Section 11 - ANNUAL REPORT

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### 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 and Dack  
**Drinking-Water System Category:** Large Municipal, Residential System  
**Period being reported:** January 1, 2016 to December 31, 2016

**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 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 2016 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:***

- A notice which will be posted on Charlton and Dack's Community Bulletin (CJBB radio)
- Discussions during public council meetings.



## 2.0 Description of the 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 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. 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). The maximum rated capacity of the plant is 561 m<sup>3</sup>/day.

### ***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.

### ***Water Storage and Pumping Capabilities***

The filtered water enters a 133 m<sup>3</sup> chlorine contact chamber then flows to a 227 m<sup>3</sup> 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. 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. An on-line turbidimeter is used to monitor the turbidity off the filters.

### ***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.

## **3.0 List of Water Treatment 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

## **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). OCWA implemented a new Workplace Management System (Maximo) in 2016 which better maintains and optimizes facility assets. All routine maintenance activities conducted at the water treatment plant were accomplished in 2016.

Significant expenses incurred in the drinking water system include:

- pH probe for handheld meter
- Permit to Take Water Renewal

## **5.0 Drinking Water System Highlights**

- The MOECC performed an annual inspection on June 22, 2016. The inspection included a physical assessment of the Charlton water treatment plant and a document review for the period of June 21, 2015 to June 21 2016. The system received a risk rating of 79.97% having six (6) non-compliance issues which were all resolved. Refer to Section 2.0 – *Requirements the System Failed to Meet* on page 12 for details.



- SAI Global conducted a re-accreditation (verification) audit of the Charlton and Bradley Drinking Water Systems' Quality and Environmental Management System (QEMS). The system and processes associated with the QEMS were evaluated on May 31, 2016 to ensure implementation of the Operational Plan and procedures and conformance to the Drinking Water Quality Management Standard. Two (2) minor non-conformances and two (2) opportunities for improvement were identified during the audit and have been resolved. Re-accreditation was achieved on July 14, 2016.
- The Charlton water treatment plant received a new classification certificate. The system changed from a Class 3 to a Class 2 water treatment subsystem.
- The MOECC issued a new Permit to Take Water (PTTW) for the Charlton drinking water system (No. 6225-AC9GWP).
- On August 3, 2016 the MOECC Approvals Branch approved the amalgamation of the Clarksville Subdivision distribution system, a privately owned system, and the Bradley Subdivision distribution system, owned by the Municipality of Charlton and Dack into one system owned by Charlton and Dack. At the same time, an agreement with Municipality of Charlton and Dack and the Town of Englehart also went into effect which sees the Bradley and Englehart distribution systems as one combined system under O. Reg. 170/03. Starting September 5<sup>th</sup>, 2016, the “new” Bradley distribution system was sampled as part of the Englehart distribution system except for lead sampling under Schedule 15 of O. Reg. 170/03.
- OCWA upgraded the outpost PLC to reduce and/or eliminate the loss of data when during network or communication problems.
- OCWA implemented a new computerized work order system (Maximo) which will better maintain the system's assets and optimize the facility. The system is used to schedule equipment maintenance activities and capture details of work performed. This information is valuable to assess equipment operation, locate equipment specifications and track any additional maintenance completed or required.

## **6.0 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 MOE's Spills Action Centre in 2016.

### **AWQI 128009 – Turbidity (2.0 NTU for greater than 15 minutes)**

January 9 @ 0730 hrs: On Monday, January 11<sup>th</sup>, the SCADA trend for January 9<sup>th</sup> was reviewed and it was discovered that the plant continued to make water with a high turbidity of 2.0 NTU from 07:30 hours to 08:52 hours. The Charlton water treatment plant has an automatic shutdown feature which is triggered when the turbidity off the filters reaches 0.8 NTU for 72 seconds. This feature failed on January 9<sup>th</sup> causing an adverse event. An investigation was conducted and a possible problem found was the contacts on the PLC card stuck, keeping the



low lift pumps running. Once the contact released (at 8:52 AM) the low lifts shut down and water was no longer directed to the next phase of treatment.

To prevent this from happening in the future, relays were installed which break the run signal from the PLC and shutdown the plant in the event that the PLC card sticks and the turbidity rises above 1 NTU.

## 7.0 Microbiological Testing Performed During the Reporting Period

### Summary of Microbiological Data

Sample Type	No. 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)	52	0 to NDOGT	0 to NDOGT	0	N/A
Treated	52	0 to 0	0 to 0	52	<10 to NDOGHPC
Distribution (Location 1)	52	0 to 0	0 to 0	26	<10 to <10
Distribution (Location 2)	52	0 to 0	0 to 0	26	<10 to 30

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.

NDOGT = No Data, Overgrown with Target

NDOGHPC = No Data, Overgrown with HPC

**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.

Refer to *Appendix A* for a monthly summary of microbiological test results.

## 8.0 Operational Testing Performed During the Reporting Period

### Continuous Monitoring in the Treatment Process

Parameter	No. of Samples	Range of Results (min to max)	Unit of Measure	Standard
Turbidity	8760	0.0 to 2.0*	NTU	1.0
Free Chlorine (contact chamber)	8760	0.93 to 3.58	mg/L	CT*
Total Chlorine (clearwell)	8760	0.46 to 3.82	mg/L	N/A

**Notes:** For continuous monitors 8760 is used as the number of samples.

The Charlton water treatment process automatically shuts down if the filter effluent turbidity reaches 0.8 NTU after 72 seconds. A high turbidity result was observed and reported as an adverse water quality incident (AWQI No. 128009) in January. Refer to Section 6.0 *Details on Notices of Adverse Test Results and Other Problems Reported to & Submitted to the Spills Action Center*.

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 0.9 mg/L in the winter months and 0.40 mg/L in the summer months to ensure primary disinfection is achieved.

### Summary of Chlorine Residual Data in the Distribution System

Parameter	No. of Samples	Range of Results (min to max)	Unit of Measure	Standard
Combined Chlorine (Location 1)	104	0.28 to 2.13	mg/L	0.25
Combined Chlorine (Location 2)	104	0.66 to 2.14		
Combined Chlorine (Location 3)	104	0.72 to 2.15		
Combined Chlorine (Location 4)	52	0.81 to 2.06		

**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 chemical test results.

### Summary of Nitrate & Nitrite Data (sampled at the water treatment plant)

Date of Sample	Nitrate Result Value	Nitrite Result Value	Unit of Measure	Exceedance
January 12	0.39	< 0.03	mg/L	No
April 11	0.32	< 0.05	mg/L	No
July 11	< 0.1	< 0.03	mg/L	No
October 3	0.30	< 0.03	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)

Date of Sample	Result Value	Unit of Measure	Running Average	Exceedance
January 12	34.1	ug/L	44.5	No
April 11	40.6			
July 11	46.9			
October 3	56.3			

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

### Summary of Most Recent Lead Data

(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 April 11<sup>th</sup> and October 4<sup>th</sup> of 2016. Results are summarized in the table below.

**Summary of pH & Alkalinity Data** (sampled in the distribution system)

Date of Sample	No. of Samples	Field pH	Field Temperature (°C)	Alkalinity (mg/L)
April 11	1	6.45	4.5	73.2
October 4	1	6.73	12	84.6

**Note:** Next lead sampling scheduled for April and October 2017

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

Parameter	Result Value	Unit of Measure	Standard	Exceedance
Antimony	< 0.5	ug/L	6	No
Arsenic	< 1.0	ug/L	25	No
Barium	12.5	ug/L	1000	No
Boron	7.0	ug/L	5000	No
Cadmium	< 0.1	ug/L	5	No
Chromium	1.0	ug/L	50	No
Mercury	< 0.1	ug/L	1	No
Selenium	< 1.0	ug/L	10	No
Uranium	< 1.0	ug/L	20	No

**Note:** Sample required every 12 months (sample date = October 3, 2016)

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

Parameter	Result Value	Unit of Measure	Standard	Exceedance
Alachlor	< 0.4	ug/L	5	No
Atrazine + N-dealkylated metabolites	< 0.9	ug/L	5	No
Azinphos-methyl	< 0.3	ug/L	20	No
Benzene	< 0.2	ug/L	5	No
Benzo(a)pyrene	< 0.005	ug/L	0.01	No
Bromoxynil	< 0.09	ug/L	5	No
Carbaryl	< 1.0	ug/L	90	No
Carbofuran	< 1.0	ug/L	90	No
Carbon Tetrachloride	< 0.2	ug/L	5	No
Chlorpyrifos	< 0.3	ug/L	90	No
Diazinon	< 0.3	ug/L	20	No
Dicamba	< 0.08	ug/L	120	No
1,2-Dichlorobenzene	< 0.2	ug/L	200	No
1,4-Dichlorobenzene	< 0.3	ug/L	5	No
1,2-Dichloroethane	< 0.2	ug/L	5	No
1,1-Dichloroethylene (vinylidene chloride)	< 0.3	ug/L	14	No
Dichloromethane	< 1.0	ug/L	50	No
2,4-Dichlorophenol	< 0.2	ug/L	900	No
2,4-Dichlorophenoxy acetic acid (2,4-D)	< 0.08	ug/L	100	No
Diclofop-methyl	< 0.08	ug/L	9	No

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

Parameter	Result Value	Unit of Measure	Standard	Exceedance
Dimethoate	< 0.3	ug/L	20	No
Diquat	< 7.0	ug/L	70	No
Diuron	0	ug/L	150	No
Glyphosate	< 20.0	ug/L	280	No
2-Methyl-4-chlororphenoxyacetic acid (MCPA)	< 10	ug/L	N/A	N/A
Malathion	< 0.3	ug/L	190	No
Metolachlor	< 0.2	ug/L	50	No
Metribuzin	< 0.2	ug/L	80	No
Monochlorobenzene	< 0.5	ug/L	80	No
Paraquat	< 1.0	ug/L	10	No
Pentachlorophenol	< 0.6	ug/L	60	No
Phorate	< 0.6	ug/L	2	No
Picloram	< 0.2	ug/L	190	No
Polychlorinated Biphenyls (PCB)	< 0.08	ug/L	3	No
Prometryne	< 0.1	ug/L	1	No
Simazine	< 0.3	ug/L	10	No
Terbufos	< 0.1	ug/L	1	No
Tetrachloroethylene	< 0.3	ug/L	30	No
2,3,4,6-Tetrachlorophenol	< 0.6	ug/L	100	No
Triallate	< 0.2	ug/L	230	No
Trichloroethylene	< 0.2	ug/L	50	No
2,4,6-Trichlorophenol	< 0.5	ug/L	5	No
Trifluralin	< 0.2	ug/L	45	No
Vinyl Chloride	< 0.2	ug/L	2	No

**Note:** Sample required every 12 months (sample date = October 3, 2016)

***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			

**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

***Summary of Additional Testing Performed in Accordance with a 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 2016.

***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	1	10.5	mg/L	9.5	No
February	1	13			
March	1	7			
April	1	15			
May	1	14			
June	1	1			
July	1	5			
August	1	5.5			
September	1	3			
October	1	31			
November	1	3			
December	1	6			



Charlton Drinking Water System

Schedule 22

# 2016 SUMMARY REPORT

## FOR MUNICIPALITIES

## Schedule 22 - SUMMARY REPORTS FOR MUNICIPALITIES

### 1.0 Introduction

<b>Drinking-Water System Name:</b>	<b>CHARLTON DRINKING WATER SYSTEM</b>
<b>Municipal Drinking Water Licence (MDWL):</b>	271-101-2 (issued February 8, 2016)
<b>Drinking Water Work Permit (DWWP):</b>	271-201-2 (issued February 8, 2016)
<b>Permit to Take Water (PTTW):</b>	5485-6UJNT7 (issued Oct. 13, 2016) - revoked 6225-AC9GWP (issued July 27, 2016)
<b>Period being reported:</b>	January 1, 2016 to December 31, 2016

### 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 regulatory requirements for an adverse turbidity incident. On January 9, 2016, from 7:30 a.m. to 8:52 a.m. a high turbidity of 2.0 NTU was leaving the filters and entering the clearwell. Although an alarm was triggered, the operator failed to recognize that water was directed to the clearwell until January 11, 2016.

<b>Drinking Water Legislation</b>	<b>Requirement(s) the System Failed to Meet</b>	<b>Duration</b>	<b>Corrective Action(s)</b>	<b>Status</b>
Schedule 17 to O. Reg. 170/03	Failed to perform all corrective actions for an adverse water quality incident (AWQI). An operator failed to review upstream operational processes to correct an adverse turbidity condition.	January 9, 2016 from 0730 hrs. to 0852 hrs.	Existing procedures for high turbidity events at the Charlton WTP and reporting and responding procedures to adverse turbidity results were reviewed and updated as required. All operators and instrumentation staff were trained on these procedures. The procedures were tested on-site and minor changes were made.  The procedure and training records were submitted to the MOECC Water Inspector on September 16, 2016.	Complete
Schedule 16 to O. Reg. 170/03	Failed to provide immediate notification of an AWQI. An operator failed to recognize an adverse turbidity incident and failed to report the event as required under the regulation. The incident was not reported to SAC and the MOH until January 11, 2016	January 9 to January 11, 2016	A list of common equipment and process failures that may result in high and or adverse turbidity events was developed. Scenarios were prepared to help operators determine if an adverse event is occurring. All	Complete

<b>Drinking Water Legislation</b>	<b>Requirement(s) the System Failed to Meet</b>	<b>Duration</b>	<b>Corrective Action(s)</b>	<b>Status</b>
			operators; including instrumentation staff were trained. A Guideline that outlines possible adverse events was developed and is posted at the Charlton WTP and located in the system's Facility Emergency Plan Binder. All operators were trained on the Guideline and training records were submitted to the MOECC Water Inspector on September 16, 2016	
Schedule 6 to O. Reg. 170/03	An operator failed to respond in a timely manner and take appropriate action during an adverse event. An operator failed to review upstream processes that would have confirmed that the plant was still directing water to the clearwell and failed to take appropriate steps to stop water with high turbidity from being directed to clearwell.	January 9, 2016 from 0730 hrs. to 0852 hrs.	A more detailed training plan has been developed and implemented for new operators.	Complete

The last MOECC inspection report dated August 15, 2016 also identified the following non-compliance items which occurred in 2015 but were resolved 2016.

<b>Drinking Water Legislation</b>	<b>Requirement(s) the System Failed to Meet</b>	<b>Duration</b>	<b>Corrective Action(s)</b>	<b>Status</b>
Section 3.4.1 of MOECC's Procedure for Disinfection in Ontario	Failed to continuously monitor filtrate turbidity. Beginning on July 28, 2015 at 1:17 p.m. the turbidimeter and alarm functions associated with it were disabled to perform a calibration. For approximately 47 hours following completion of the calibrations no alarm function had been restored and no turbidity monitoring test results were being recorded from the turbidimeter for water leaving the filters.	July 28, 2015 at 1317 hrs. to July 30 at 1210 hrs.	In response to this incident OCWA reported to the Ministry that operators and instrumentation technicians have been instructed to document turning alarm functions off and then on again in the logbook to ensure alarming has been returned to proper function. Further, to prevent water with high turbidity from being directed to the clearwell additional relays were installed between the turbidity meter and the	Complete





Drinking Water Legislation	Requirement(s) the System Failed to Meet	Duration	Corrective Action(s)	Status
			programmable logic controller (PLC) to break the signal when the turbidity continues to increase beyond the programmed auto-shutoff set points.	
Schedule 6 to O. Reg. 170/03	Failed to operate continuous monitoring equipment as per requirements of Section 6-5(1)5 and/or 6-5(1.1) of Schedule 6 to O. Reg. 170/03. On July 28, 2015 at approximately 1317 hrs. the alarm for the continuous turbidity analyzer was disabled to conduct calibrations. Upon completion of the calibrations the alarm function was not restored and therefore was not equipped to alarm or shut down as required.	July 28, 2015 at 1317 hrs. to July 30 at 1210 hrs.	A procedure was developed which describes the steps to take to test alarms. All operators and Instrumentation Techs were trained on this this procedure.  The procedure and training records were submitted to MOECC Water Inspector On September 16, 2016	Complete
Schedule 6 to O. Reg. 170/03	Failed to operate continuous monitoring equipment as per requirements of Section 6-5(1)1 of Schedule 6 to O. Reg. 170/03. On July 28, 2015 at approximately 1317 hrs. the continuous turbidity analyzer was disabled so that calibrations could be conducted. Upon completion of the calibrations the analyzer was not returned to normal functioning mode and was not recording data at the specified frequency as required	July 28, 2015 at 1317 hrs. to July 30 at 1210 hrs.	A procedure was developed to describe checks to be conducted to ensure that the analyzer is fully functional after a calibration. All operators and instrumentation staff were trained on this procedure.  The procedure and training records were submitted to MOECC Water Inspector On September 16, 2016	Complete

### 3.0 Summary of Quantities and Flow Rates

#### *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 2016 reporting period, including total monthly volumes, average monthly volumes, maximum monthly volumes, and maximum flow rates.

### Raw Water

#### 2016 - 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 <sup>3</sup> )	4583	4311	4627	3725	3007	3450	3032	3544	2845	2976	3439	3644	43183
Average Volume (m <sup>3</sup> /d)	148	149	149	124	97	115	98	114	95	96	115	118	118
Maximum Volume (m <sup>3</sup> /d)	198	163	167	156	150	185	141	179	119	136	164	133	198
PTTW - Maximum Allowable Volume (m <sup>3</sup> /day)	842	842	842	842	842	842	842	842	842	842	842	842	842
Maximum Flow Rate (L/min)	233	181	181	265	178	256	261	180	246	257	247	258	265
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 never exceeded this allowable limit having a maximum volume of 198 m<sup>3</sup> on January 11<sup>th</sup>. The Permit also allows a maximum flow rate of 585 L/minute. At no point during the reporting period did the system exceed this rate having a maximum recorded flow of 265 L/minute on April 14<sup>th</sup>, during maintenance of the in-line mixer.

### Treated Water

#### 2016 - 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 <sup>3</sup> )	4173	3906	4204	3434	2769	3189	2865	3487	3084	3484	4216	5418	44229
Average Volume (m <sup>3</sup> /d)	135	135	136	114	89	106	92	112	103	112	141	175	121
Maximum Volume (m <sup>3</sup> /d)	165	144	152	145	131	170	126	163	125	130	179	189	189
MDWL - Rated Capacity (m <sup>3</sup> /day)	561	561	561	561	561	561	561	561	561	561	561	561	561



Schedule C, Section 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 a maximum flow rate of 561 m<sup>3</sup> on any calendar day. The Charlton DWS complied with this limit having a recorded maximum volume of 189 m<sup>3</sup>/day on December 31, 2016, which is 33.7% 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. This information enables the Owner to assess the system’s existing and future planned water usage needs.

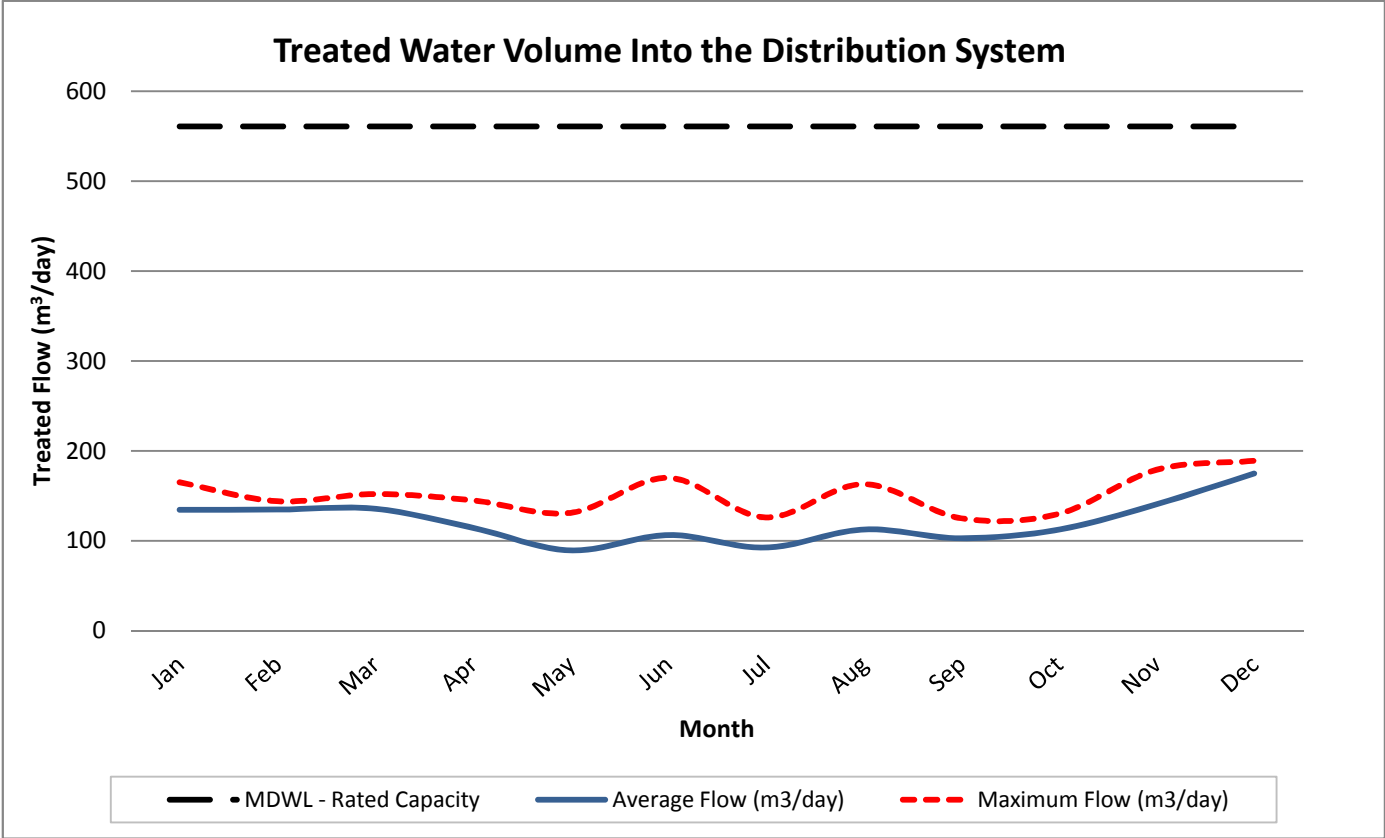
***Comparison of the Flow Summary to Systems Licence & Permit***

Rated Capacity of the Plant (MDWL)	561 m <sup>3</sup> /day	
Average Daily Flow for 2016	121 m <sup>3</sup> /day	21.6 % of the rated capacity
Maximum Daily Flow for 2016	189 m <sup>3</sup> /day	33.7 % of the rated capacity
Total Treated Water Produced in 2016	44,229 m <sup>3</sup>	

The Charlton water treatment plant is rated to produce 561 cubic meters of water per day as specified in the system’s Municipal Drinking Water Licence. The average daily flow was 121 m<sup>3</sup> per day, which is 21.6% of the rated capacity. This information clearly shows that the plant is well within its rated capacity and is able to meet current demands of consumers.

**Figure 1: 2016 - Daily Volume of Treated Water into the Distribution System**

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average Flow (m <sup>3</sup> /day)	135	135	136	114	89	106	92	112	103	112	141	175
Maximum Flow (m <sup>3</sup> /day)	165	144	152	145	131	170	126	163	125	130	179	189
MDWL - Rated Capacity	561	561	561	561	561	561	561	561	561	561	561	561
% Rated Capacity	29	26	27	26	23	30	22	29	22	23	32	34





## CONCLUSION

In 2016, the Charlton Drinking Water System (DWS) met the terms and conditions outlined in its site specific drinking water works permit and municipal drinking water licence having no incidents of non-compliance during the reporting period. 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.

However, in January, the system did not meet all the requirements of O. Regulation 170/03 when a Charlton DWS operator failed to respond, report and perform corrective as required by Schedule 16 and 17 of the regulation. These three non-compliance items along with three issues identified for 2015 were listed as violations in the annual MOECC inspection report and are further explained in Section 2.0 *Requirements the System Failed to Meet*. All issues have been resolved.



# **APPENDIX A**

Monthly Summary of Microbiological  
Test Results

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

**Facility Org Number:** 5049  
**Facility Works Number:** 220005768  
**Facility Name:** CHARLTON DRINKING WATER SYSTEM  
**Facility Owner:** Municipality: Municipality of Charlton and Dack  
**Facility Classification:** Class 2 Water Treatment  
**Service Population:** 250.0  
**Total Design Capacity:** 561.0 m3/day  
**From:** 01/01/2016 to 31/12/2016

	01/2016	02/2016	03/2016	04/2016	05/2016	06/2016	07/2016	08/2016	09/2016	10/2016	11/2016	12/2016	Total	Avg	Max	Min
<b>RAW WATER</b>																
<b>Englehart River / Total Coliform: TC - cfu/100mL</b>																
Count Lab	4	5	4	4	5	4	4	5	4	5	4	4	52			
Max Lab	212	68	292	NDOGT	NDOGT	8	< 10	12	45	208	465	< 600			NDOGT	
Mean Lab	131	< 37.2	203.5	152.667	< 20	7	< 6.5	4.4	21.25	132.4	378	< 171.5		< 102		
Min Lab	60	< 2	54	90	< 2	6	< 2	0	4	16	280	< 2				0
<b>Englehart River / E. Coli: EC - cfu/100mL</b>																
Count Lab	4	5	4	4	5	4	4	5	4	5	4	4	52			
Max Lab	< 4	< 2	6	NDOGT	NDOGT	< 2	< 2	< 2	6	14	< 4	< 4			NDOGT	
Mean Lab	< 2.5	< 2	< 3.5	< 4	< 2	< 2	< 2	< 1.2	3.75	5.8	< 2.5	< 2.5		< 2.8		
Min Lab	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 0	2	2	< 2	< 2				0
<b>TREATED WATER</b>																
<b>Treated Water (POE) / Total Coliform: TC - cfu/100mL</b>																
Count Lab	4	5	4	4	5	4	4	5	4	5	4	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
<b>Treated Water (POE) / E. Coli: EC - cfu/100mL</b>																
Count Lab	4	5	4	4	5	4	4	5	4	5	4	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
<b>Treated Water (POE) / HPC - cfu/mL</b>																
Count Lab	4	5	4	4	5	4	4	5	4	5	4	4	52			
Max Lab	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NDOGHPC	< 10	< 10	20	< 10			NDOGHPC	
Mean Lab	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 12.5	< 10		< 10.196		
Min Lab	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10				< 10

	01/2016	02/2016	03/2016	04/2016	05/2016	06/2016	07/2016	08/2016	09/2016	10/2016	11/2016	12/2016	Total	Avg	Max	Min
<b>DISTRIBUTION WATER</b>																
<b>C-3 (Bacti) / Total Coliform: TC - cfu/100mL</b>																
Count Lab	4	5	4	4	5	4	4	5	4	5	4	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
<b>C-3 (Bacti) / E. Coli - cfu/100mL</b>																
Count Lab	4	5	4	4	5	4	4	5	4	5	4	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
<b>C-3 (Bacti) / HPC - cfu/mL</b>																
Count Lab	2	3	2	2	2	2	2	3	2	2	2	2	26			
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
<b>C-4 (Bacti) / Total Coliform: TC - cfu/100mL</b>																
Count Lab	4	5	4	4	5	4	4	5	4	5	4	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
<b>C-4 (Bacti) / E. Coli - cfu/100mL</b>																
Count Lab	4	5	4	4	5	4	4	5	4	5	4	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
<b>C-4 (Bacti) / HPC - cfu/mL</b>																
Count Lab	2	2	2	2	3	2	2	2	2	3	2	2	26			
Max Lab	< 10	< 30	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10			30	
Mean Lab	< 10	< 20	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10		< 10.769		
Min Lab	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10				< 10

**Notes:**

**NDOGT = No Data, Overgrown with Target**

**NDOGHPC = No Data, Overgrown with HPC**





# **APPENDIX B**

Monthly Summary of Operational Data

**CHARLTON DRINKING WATER SYSTEM  
MONTHLY SUMMARY OF OPERATIONAL DATA**

**Facility Org Number:** 5049  
**Facility Works Number:** 220005768  
**Facility Name:** CHARLTON DRINKING WATER SYSTEM  
**Facility Owner:** Municipality of Charlton and Dack  
**Facility Classification:** Class 2 Water Treatment  
**Service Population:** 250.0  
**Total Design Capacity:** 561.0 m3/day  
**From:** 01/01/2016 to 31/12/2016

	01/2016	02/2016	03/2016	04/2016	05/2016	06/2016	07/2016	08/2016	09/2016	10/2016	11/2016	12/2016	Total	Avg	Max	Min
<b>FILTERED WATER</b>																
Filtration / Turbidity - NTU																
Max OL	2.0*	0.714	1.77*	1.27*	1.14*	0.939	0.727	1.31*	0.8	0.8	0.553	0.8			2.0	
Mean OL	0.101	0.06	0.049	0.05	0.052	0.05	0.053	0.06	0.054	0.053	0.065	0.057		0.059		
Min OL	0.018	0	0.022	0.018	0.03	0.03	0.032	0.04	0.022	0.026	0.032	0.019				0

<b>TREATED WATER</b>																
Contact Chamber / Cl Residual: Free - mg/L																
Max OL	2.767	2.887	2.683	2.264	2.411	2.253	1.691	2.549	2.225	2.319	3.295	3.578			3.578	
Mean OL	1.991	1.709	1.734	1.729	1.568	1.508	1.484	1.419	1.354	1.51	1.918	2.062		1.665		
Min OL	0.93	1.11	1.047	1.011	0.978	1.162	1.193	0.991	0.982	1.00	1.052	1.163				0.93
Clearwell / Cl Residual: Total - mg/L																
Max OL	3.721	2.871	3.069	2.966	2.667	2.216	1.762	1.915	1.911	1.814	2.564	3.824			3.824	
Mean OL	1.678	1.821	1.812	1.704	1.738	1.462	1.38	1.433	1.467	1.449	1.777	1.951		1.639		
Min OL	0.456	0.858	0.96	0.51	0.856	1.005	0.808	0.819	0.909	1.06	0.856	0.555				0.456

<b>DISTRIBUTION WATER</b>																
Residual No. 1 / Cl Residual: Combined - mg/L																
Count IH	8	9	8	9	9	9	8	9	9	9	8	9	104			
Max IH	2.05	1.74	1.98	2	1.87	1.6	1.62	1.77	1.33	1.7	1.73	2.13			2.13	
Mean IH	1.78	1.611	1.668	1.707	1.281	1.421	1.461	1.442	1.203	1.257	1.484	1.818		1.51		
Min IH	1.51	1.09	1.38	1.42	0.28	1.08	1.33	1.17	1.04	1.05	1.12	1.48				0.28
Residual No. 2 / Cl Residual: Combined - mg/L																
Count IH	8	9	8	9	9	9	8	9	9	9	8	9	104			
Max IH	2	2	1.92	2.03	1.85	1.82	1.53	1.84	1.43	1.63	2.09	2.14			2.14	
Mean IH	1.813	1.744	1.698	1.781	1.562	1.367	1.378	1.448	1.328	1.388	1.714	1.98		1.60		
Min IH	1.57	1.4	1.37	1.46	1.41	0.66	1.13	1.09	1.19	1.24	1.1	1.6				0.66
Residual No. 3 / Cl Residual: Combined - mg/L																
Count IH	8	9	8	9	9	9	8	9	9	9	8	9	104			
Max IH	2.06	2.07	2.13	2.05	1.69	1.79	1.72	1.67	1.45	1.53	2.15	2.12			2.15	
Mean IH	1.885	1.839	1.809	1.786	1.472	1.519	1.481	1.361	1.316	1.281	1.833	1.91		1.62		
Min IH	1.68	1.62	1.6	1.4	1.15	1	1.28	1.13	1.1	0.72	1.52	1.31				0.72
Residual No. 4 / Cl Residual: Combined - mg/L																
Count IH	4	5	4	4	5	4	4	5	4	5	4	4	52			
Max IH	1.85	1.83	2.02	2.06	1.82	1.55	1.54	1.66	1.24	1.5	1.8	1.95			2.06	
Mean IH	1.638	1.774	1.83	1.755	1.5	1.443	1.475	1.402	1.068	1.23	1.59	1.555		1.52		
Min IH	1.38	1.68	1.49	1.5	1.33	1.27	1.37	1.14	0.81	0.95	1.44	1.2				0.81

**\* Notes:**

A high turbidity result was observed and reported as an adverse water quality incident (AWQI No. 128009) in January.

Turbidity exceedances occur when two (2) readings are above 1 NTU for 15 minutes or more in a 24 hour period. Turbidities above 1.0 NTU were detected in March, April, May and August and the plant shutdown in each event. The Charlton water treatment process automatically shuts down if the filter effluent turbidity reaches 0.8 NTU after 72 seconds.